Low-Sodium Diet

A Manual for the Patient

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LONDON
HENRY KIMPTON
25 BLOOMSBURY WAY, W.C.1

PRINTED IN AMERICA

TO

MY WIFE

Who has been most helpful
in the preparation
of this Manual

Foreword

For the past two or three decades there has been an increasing awareness of the importance of salt consumption in a patient with congestive heart failure. At first only vague efforts were made to limit the intake of salt, but it became increasingly apparent that there was a very great necessity for strict restriction if the patient were to get along comfortably. In fact, in many instances the question whether an individual is in or out of congestive failure depends on the ingestion of salt or the sodium ion. The dieticians have done a marvelous job in making adequate, and, to a degree, palatable diets with this restriction.

However, it should be understood that the restriction of sodium or salt often has nothing to do with the underlying condition, and does not cure the basic disease. The patient's problem, therefore, is in living comfortably with this basic situation. Marked curtailment in his salt intake often makes this possible.

Housewives are confronted with the problem of providing a nourishing diet which will be sufficiently lean in its sodium content so that the patient can remain in a great degree of comfort and good health, and at the same time they must attempt to offer meals which will afford enough pleasure to tempt the appetite.

With a view of supplementing the excellent job that the doctors and dieticians have done, Dr. Thurman Rice has set forth in this book not only an effective program but also a clear understanding of the whole problem in such language as may readily be understood by the patient and the housewife who must prepare his food.

James O. Ritchey, M.D.

Professor of Medicine, Indiana University School of Medicine.

Preface

THERE are tens of thousands of persons for whom the low-sodium diet (commonly called the "salt-free" diet), has been prescribed. Undoubtedly there are as many more who *should* be practicing such a regimen, but are not doing so because of the supposed difficulty. There is no use denying that it is easier to live according to the usual routine, but it is also a fact that many or even most of the difficulties encountered in this special diet are such as can be overcome quite easily.

There is little published information to help the housewife or cook, responsible for preparing low-sodium food. Individual physicians and hospitals have put out mimeographed direction sheets and we have no doubt that they are very excellent as far as they go. They are easily misplaced, however, lost, torn and otherwise destroyed. It is hoped that this manual, durably bound, and more complete than are most of such instruction lists, will be of service both to the physician and the patient.

The immediate stimulus which has actuated the effort to prepare such a manual is a personal one. The author himself has been put on a low-sodium diet and is therefore anxious to understand it as well as possible. His large experience in writing for laymen, the fact that he has taught nutrition in Indiana University School of Dentistry for more than twenty years, and that he has spent years as a teacher of medical subjects in the Medical School of the same University, along with his wish to be of service, have worked together to impel him to undertake the present effort. He is greatly indebted to his wife who, besides being an excellent and original cook, has been greatly intrigued with the possibility that she might make her own dietary task more intelligible to herself and more useful to her husband, as she has prepared the special foods required by him. She has accepted the

task as a challenge to her ability as a cook and has contributed a great many original ideas and suggestions.

It is the author's purpose to set forth the low-sodium diet; he makes no attempt to tell *when* it should be used; or in any way to recommend its use or its discontinuance. At all times it is recommended that the patient using such a diet keep close to his physician for diagnosis, treatment, and direction.

The author's aim is to be as accurate as the directing physician may wish, and as plain and non-technical as the layman may require. He wants this little book to be just as *simple*, just as *practical*, and just as *useful* as it is possible for it to be, and to those who are on a low-sodium diet, *he hopes it may bring improved health and* good eating.

The author, though he is a physician, makes no claim to being an authority on the subject of circulatory or other disease requiring low-sodium diet, but he is fortunate in having the advice of those who are entitled to be regarded as such. He wishes to make it very plain that this manual is not in any way intended to replace the counsel of the physician in charge of the particular clinical case. In handling the dietetic phases of the subject he has had the assistance of the Dietetics Department of the Indiana University Hospitals and of the Indianapolis General Hospital.

Particularly am I indebted to Dr. James O. Ritchey, Professor of Medicine of Indiana University School of Medicine, and Dr. Helen Van Vactor, my personal physicians; to Dr. Kenneth Kohlsteadt, Director of Medical Research, Eli Lilly & Company; to Dr. John Ferree, Public Health Director of the American Heart Association, to the staff of Mead Johnson Company of Evansville, Indiana, and to many others who have given aid or encouragement in this endeavor.

THURMAN B. RICE, M.D.

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Contents

THE LOW-SODIUM DIET

1

The Forms of Sodium Found in Food

In referring to the *low-sodium* diet the term "salt-free" is often used. There is no such thing as a "salt-free" or "sodium-free" diet. There is some sodium in practically everything that we eat inasmuch as sodium is a very common ingredient of the soil in which plants grow, and is always present to some extent in the plant and animal products which are used as food. Persons on a low-sodium formula are told *not to use table salt from the shaker* and so the term "salt-free" has come into use. When the emphasis is wrongly placed upon table salt, there is a strong tendency to forget other sources of sodium than those found in the shaker.

Health requires that there be a rather uniform concentration of sodium in the fluids of the body, but there is such an abundance of it in the world about us that many persons tend to take in too much of it, or what amounts to the same thing, their bodies retain too much of it. We shall discuss in another place how it causes trouble when this happens.

We shall present the simple chemistry which is necessary to a real understanding of this point. What are the sources of sodium in our food which must be considered? They are arranged below roughly in the order of their importance to the patient:

1. *Sodium chloride* (common salt, table salt) has the chemical formula, NaCl which means that it is composed of one atom of sodium (Na) combined with an atom of chlorine (Cl). It is with the sodium that we are here concerned. The chlorine in the form of chlorides is useful in the body for various purposes and is an important ingredient of food. It will be discussed later.

Certain saline cathartics contain large amounts of sodium salts. For the most part they are not absorbed but pass quickly from the bowel. The cheapest of all saline cathartics is Glauber's salts (sodium sulphate, Na_2SO_4). It is added to many bottled saline cathartics, and is practically the sole ingredient of several of the cathartics used in reducing. While it is true that only a small percentage of it is absorbed by the body, some of it may be retained and to that extent it acts as any other sodium. If it is felt that a saline cathartic is needed, the low-sodium patient had better use Epsom salts (magnesium sulphate) in some form.

Sodium benzoate and sodium salicylate have been used in foods as a preservative in times past but the amount now used is negligible, except possibly in the case of a few people who find that home canning is made easier and the products need to be heated less when these preservatives are used. This use cannot be recommended, however, even for persons who are on a normal diet. Many forms of pickled foods have been soaked in brine. Bleached fruits and other products may have been treated with *sodium* sulphite. Hominy has been processed with *sodium* hydroxide. Ice cream is often "stabilized" by the addition of *sodium* alginate. When any chemical is used in the processing of commercial foods—and it is common practice—it is very likely to be a *sodium* salt of some sort because the sodium salts are cheap, easily dissolved and generally have an agreeable flavor—*i.e.*, the flavor of salt.

One wonders, perhaps, how it is that the use of salt as a food accessory has become so nearly universal. The herbivorous animals (particularly cattle, sheep, goats, deer) will go long ways to get salt, and the "licks" where found are much patronized by them. They will gulp down salt by the handful when it has not been regularly supplied in the form of rocksalt. The carnivorous animals get along very well with the natural sodium. The human species, fortunately needs salt much less than herbivores except when he is perspiring a great deal. Many races of men have a diet that is not salted with a shaker, and they do very well, though most races prefer some added salt and will go to considerable trouble and expense to get it. It is a delicacy—and an expensive one—in many countries. Nearly everyone in our country wants salt added to his food and large numbers of people simply pour it on even before tasting.

There is little doubt that the practice of heavy salting is to be discouraged. In case a person accustomed to heavy salting should develop symptoms calling for a low-sodium diet, he will find the

2. *Sodium* is found naturally in more or less concentration in practically all foods. There is only one way to estimate this, and that is by consulting tables and charts which indicate how much is to be found in various products. Fruits have little as a rule, but foods of animal origin have rather much of it. This is an important source of sodium and must be watched closely if one is on a *strict* diet. Unfortunately the amount of natural sodium in food varies rather widely.
3. *Sodium bicarbonate* (baking soda, or "soda" as the term is used by the housewife) has the formula ($NaHCO_3$). We need consider nothing in this compound except the sodium (Na). It is exactly the same substance as the sodium in the table salt, and its presence as a common ingredient of baked foods must be kept in mind.
4. *Baking Powder* is of various sorts, but all of the usual varieties of baking powder are alike in that they all contain baking soda ($NaHCO_3$) and for that reason must be considered important in this whole problem.

Other sources of sodium that are very prone to be forgotten are numerous. It is so easy to reach for the catsup bottle, for example. Nearly every such highly flavored product which is used to enhance the taste of meats and vegetables contains a great deal of salt. It is true that only a little catsup is used, but the high concentration of the product makes it objectionable.

Most of the delicacies served between meals are rather heavily salted: nuts, canapes, potato chips, cheese bits, candy (especially chocolate), pickles, relishes of all sorts, *etc.*, meat sauces, mayonnaise, dressing of various kinds and tidbits in general contain salt in rather high concentration.

In some localities where the soil or water-bearing strata of the subsoil is saline or alkaline, there may be considerable sodium in the drinking water. In such case the patient should use rain water or a suitable bottled water for drinking and cooking purposes. The inhabitants of most communities need give no heed to the possibility of sodium in the water, however. The *softened* water prepared by most water softeners, contains appreciable amounts of sodium and should not be drunk or used in the cooking of foods for low-sodium diet cases, unless it falls within the tolerance allowed. While the amount of sodium so received is not great, it may well be significant in many cases.

2

Why Sodium May be Injurious

WE must remind the reader that sodium has no *direct* injurious effect upon the heart or the blood vessels. It is a normal constituent of the fluids of the body and has certain uses which are of great importance. As a matter of fact, it is an essential ingredient of the fluids of the body in which the cells live somewhat as do one-celled animals in the salt (mostly sodium chloride) water of the ocean. These fluids correspond in concentration to about a 0.9 per cent solution of various salts of which a greater part are sodium salts—0.72 per cent. It is a function of the kidney to hold the salt and water, or to excrete them in such amounts as will maintain the internal environment of the body at a desired level of salt concentration. What then is wrong with taking more salt than is actually needed? We shall discuss this point after seeing how sodium is excreted.

How is sodium lost from the body? In general there are three ways:

1. It is mostly excreted in the urine. Unfortunately some persons do not excrete sodium as rapidly as may be needed to prevent accumulation in their particular case.
2. It is also excreted in the sweat. Persons in need of a low-sodium diet commonly do not sweat as much as other persons because they are ill and do not dare exert themselves vigorously, or are uncomfortable in doing so.
3. A small amount is excreted from the bowel. Studies are being made to find ways to increase this means of sodium loss by using a product which will prevent salt from being absorbed from the bowel. Certain resins by being taken by mouth have this effect but as yet the product will not take the place of the low sodium diet for the patient who lives at home. The reasons are technical and can hardly be explained in this place.

requirement much more difficult than if he had been more moderate in his daily life. It is furthermore possible that the heavy use of salt may tend to bring the need of low-sodium diet upon an individual already upon the threshold of certain diseases. If he is perspiring a great deal and for that reason needs more salt, he would do better to supplement his intake with a definite dosage of *salt tablets* without disturbing his taste for the more natural foods as commonly prepared. By the use of such tablets the required dosage is conveniently and accurately arranged.

If then, the individual either takes a larger amount of sodium than is needed, or if he fails to excrete it as well as a normal individual should, or if a combination of these conditions should exist, sodium tends to accumulate in the system.

In what form does this accumulated sodium or salt exist? Obviously it does not appear in the form of crystals, such as are seen in the salt shaker. By no means! It *must* be held as a water solution with a salt (sodium chloride) concentration of slightly more than 0.7 per cent, which means that an ounce of salt requires about 120 to 140 ounces of water (approximately a gallon) to hold it in solution. In the old days when dropsy was a common symptom of congestive heart disease, it was not uncommon to "tap" the abdomen, or to slash the watery tissues to allow the excess of fluid to escape. A gallon of such fluid seemed a large amount, but it removed only about an ounce of salt and it began to accumulate again immediately. How much better to leave that much salt out of the diet than to remove fluid surgically by tapping.

It must not be supposed that the salt and water are suddenly accumulated, though it is a well-known fact that a serving of cured ham or salt fish will cause one to be very thirsty and to drink a large amount of water within the next few hours. The process of accumulation is a gradual one as a rule, and the individual simply supposes that he is gaining in weight in the normal way — that is by the deposition of fat. He usually feels perfectly well until the accumulation of fluids begins to be noticeable as a swelling of the ankles, the hands or the face. If the accumulation is in the lungs there will be difficulty in breathing particularly when lying down, and shortness of breath upon the slightest exertion. By the time the symptoms become marked, the accumulation of fluid is of such amount as will require probably a few weeks of low-sodium diet, high urinary output, and bed rest to rid the body of so much sodium and water. *Warning is seen in tendency to swelling, any shortness of breath, any symptoms of heart weakness or failure,* any return of untoward symptoms. One dare not take chances in the presence of these symptoms.

Is it possible to use a substitute for the various sodium preparations used in cooking? Yes, indeed! Excellent substitutes for table salt are available; potassium bicarbonate can be used for baking soda; a non-sodium baking powder can be obtained. Yeast can be used instead of soda or baking powder for many purposes. The body, however, *needs* the chloride part of table salt for various purposes not pertinent to our present discussion. Substances much

like sodium in their ability to carry chloride, are potassium, lithium and ammonium. Why not use the chlorides of these elements? Potassium chloride and ammonium chloride have been used in this way for some time but are not very pleasant to the taste, being somewhat sharp and biting. Lithium chloride has been so used but has been dropped because it may be poisonous to some persons.

Many substitutes for salt are on the market. They are mixtures for the most part of potassium chloride, ammonium chloride, potassium formate, calcium formate, magnesium citrate, ammonium glutamate, glutamic acid, choline and starch. They are quite harmless, and more or less improve the taste of the food. To most patients they are definitely less pleasant to the taste than salt but better than nothing. Some patients simply learn to do without both salt and salt substitutes. Foods of bland taste, salted with a substitute tend to have an unpleasant after taste; highly flavored foods taste about the same as when flavored with table salt. Whether substitutes are used or not is for the most part a matter of personal preference, though some thought must be given to the matter of a possible chloride deficiency if there is no salt-shaker source of this element (chlorine) available. Some of the above ingredients may change after prolonged cooking. It is better for this reason to use them late in the cooking process when that is possible or convenient.

There is often little hope of a fully satisfactory result in medical treatment so long as the surplus of sodium remains in the tissues of the patient. In old days it was customary to restrict the amount of water taken in. This seemed a logical procedure, but actually was quite wrong, as it only dried up the urinary output with the result that the sodium and the various other wastes of the body were not excreted but allowed to remain or even accumulate in the tissues. Withholding water actually made the condition worse. Nowadays, we would usually give the patient all the water he wants, and even insist that he drink more than he wants, but would very sharply exclude all but a very little sodium—such an amount as could be easily eliminated day by day. With a large intake of water the amount of urine produced is increased and in general the more urine excreted the more salt is carried away. As the surplus of salt is reduced, the watery condition (edema) of the tissues is relieved and the condition of the patient is improved. It may seem odd to give large amounts of water to get rid of water, but that is essentially the way it works.

The weight so lost can be regained very easily indeed. If the tolerance (the amount of salt allowed a day) is 1 gram (1,000 milligrams) per day, an additional gram would theoretically hold 120 to 140 grams of water daily if the salt should be retained in the body. It does not take many ounces of highly salted steak or ham to cause the individual to gain a pound of weight though there has been little if any increase in actual flesh. The losing of the same amount, however, may be a slow and tedious process. Once one has reached a satisfactory equilibrium by the use of a low-sodium diet, it is far better to persist in it even though it may become somewhat monotonous. The individual on a low-sodium diet will naturally wish to have as liberal a menu as may safely be indulged, but must be very careful to watch for *any increase in weight, any return of symptoms.*

The question arises, "Why do not these related 'salt substitutes' also hold water in the tissues?" The answer is that they do to a small extent, but very fortunately they are far more easily excreted, and it is comparatively easy to get rid of an excess of them. Furthermore, they are less pleasant to the taste and there is less danger of them being taken in excess. Apparently there is no scientific objection to the use of such substitutes as may be recommended by the physician.

WARNING SIGNS

Too Much Sodium.—Increase in weight, swelling of ankles, hands or face; shortness of breath when lying down or on slight exertion; return of symptoms which called for a low-sodium diet in the first place. The patient should see his physician at once and become very conscientious in getting back to a strict low-sodium diet.

Too Little Sodium.—Muscle cramps, weakness, faintness, nausea, vomiting. The symptoms are the same as those for heat stroke arising when one has been sweating excessively and has lost too much salt. In very hot weather when one is sweating profusely, it may be well to be somewhat less strict in the low-sodium diet. Most such patients should, of course, be careful to avoid heavy work in hot weather.

While these signs are useful as an indication of immediate danger, a frequent regular check-up with the physician is by all means to be recommended.

3

Where and How Does One Obtain Low-Sodium Foods?

THE inhabitant of a large city should have little trouble in securing suitable foods. Those living in the country or a small town may be put to some inconvenience. It is possible even there, however, to do very well as soon as the one who prepares the food has learned a few tricks and has an address or two of companies producing low-sodium food; a mail order or parcel post arrangement may be set up with a company furnishing such foods. The various types of foods will be considered separately in the order of their importance.

Bread and Bakery Products.—Many large hospitals have their own bakeries and make their own salt-free bread. Some of them may occasionally make rolls suitable for the sodium-low diets, or other products. Arrangement can usually be made with them to buy the products, provided some sort of a regular schedule can be arranged. If the hospitals do not bake their own bread, they can usually inform the patient where and how he can get some from a commercial source. The bread is well wrapped and need be fresh only twice a week, or with care it will be well preserved for a whole week (in the refrigerator). Very often the bread is sealed in a tin can and will keep indefinitely if the seal is unbroken.

If the housewife bakes her own *bread* and *rolls* she may use *yeast* instead of soda or baking powder as a leavening agent. Non-sodium "baking powder" instead of commercial brands of baking powder, or potassium bicarbonate instead of "soda" can be used. Naturally, she uses no salt in the baking, but if she wishes may use a salt substitute. She can take the same dough as is used for bread and make *rolls*. Most people find salt-free bread quite acceptable if it is well made. Bread baking in the home is, however, a refined art and it is one that has been neglected in recent

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years. Toasting usually improves salt-free bread. Prepared flour mixes of various sorts probably all contain salt and soda, or baking powder. They cannot be used.

Pie dough is very good without salt. As a matter of fact, the salt is rarely missed. It does not need baking soda or baking powder. The prepared pie doughs probably always contain salt and should be avoided. Pancake and cake prepared mixes almost always contain *both* salt and soda or salt and baking powder, but there are home recipes for making them low in sodium.

Cookies and commercial *cakes* always contain added sodium (salt, soda or baking powder) unless they are sold at special diet food counters. *Crackers* without added sodium are usually available in large cities, though they are far less tasty than regular crackers.

Breakfast Foods and Cereals.—There is rather little sodium in the cereals in their native state but nearly all prepared cereals served dry have salt added—exceptions are Puffed Wheat, Puffed Rice, Shredded Wheat, Muffets and possibly others. Cooked cereals, such as Wheatena, Cream of Wheat, Ralston, rolled oats, cracked whole wheat, rice, barley and the like, are low in sodium but do very well with salt substitute.

Meats and Fish.—Fresh cuts of meat are without salt but are moderately high in natural sodium. Cured meats of all sorts are, however, heavily salted and to be avoided—bacon, cured ham, dried beef, *etc.* All prepared sandwich meats, wieners, frankfurters, bologna, salami and related products, are salted. Prepared sausage practically always has salt, but hamburger usually does not. If salt-free sausage is desired the butcher will grind fresh pork. It can then be seasoned with salt substitute if desired. A bit of sage will give it a flavor enjoyed by many. A kitchen-produced meat loaf with fresh meat and crumbs from salt-free bread is very good as sandwich meat.

Fresh-water fish have no more salt in them than other meats, but sea foods of most sorts—clam, shrimp, halibut, sardines, salmon, tuna and the like, are quite rich in sodium. Most canned meats and fish are high in sodium content.

Milk and Cheese.—Milk contains about 500 milligrams of sodium per quart even as it comes from the cow. A half pint glass then represents about 125 milligrams and such an amount is quite enough to be highly significant and should be counted in estimating the diet. Cottage cheese as made commercially, has salt added in considerable amount. It also has considerable native sodium from the milk used in making it. The salt can be removed by putting

the cottage cheese in a dialyzing bag of cellophane and letting it stand for a few hours in running water, but flavor, minerals and vitamins will be removed at the same time. The dialyzed cheese will need something to give flavor. This can be supplied by serving with onion, mango, tomato, pineapple, peaches, pears, and other fruits. Of the solid cheeses on the market, many are very high in sodium and all are rather well supplied. Swiss cheese is usually lowest at about 125 milligrams of sodium per ounce of cheese. Its high flavor is much appreciated but its sodium content must be considered. Powdered cheese is high in sodium but is served in such small amounts that it can be considered for flavoring when the patient's tolerance is rather high.

Butter.—Unsalted butter can be bought at kosher markets, but many people do not like its flavor. A few dairies produce salt-free butter. Butter can be made from fresh whipping cream by beating it with an egg beater. All unsalted butters readily turn rancid and are soon pretty "high." When the unsalted butter becomes rancid it can be set aside and used for flavoring of certain salt-free foods which need more flavor. Potato soup enriched with rancid butter has an excellent cheese-like flavor which is much appreciated as a rule.

Vegetables.—These vary widely in the amount of native sodium they contain and in the amount they need for palatability. Those with high flavor do pretty well with salt substitutes, but the bland ones usually have some unpleasant aftertaste. Frequently they can be mixed with something else with high flavor. A bit of vinegar and sugar will often give a "fillip" which will be welcomed. A few drops of vinegar in soup beans or green beans makes them taste definitely more salty. The use of vinegar with all sorts of greens is well known. Potatoes browned in grease in which meat has been broiled gain flavor. When meat is broiled some of the sodium is lost in the grease. If potatoes are fried in this grease, a considerable amount of sodium is added. Try browning a few onions in salt-free butter and then fry the potatoes with the butter and onions. Radishes, celery, carrots eaten raw are very good without salt. Sweet potatoes are commonly served unsalted. Those vegetables classed as "greens" and the true roots stand rather high in natural sodium.

Fruits present very little problem as they are usually eaten without salt. Melons, tomatoes, grapefruit, and a few others are sometimes taken with salt, but can as well be served without. Dried fruits contain more sodium than the fresh ones.

Canned Goods and other specialties processed without salt can be purchased at special diet stores or at counters in certain chain stores. As a rule they are without *both sugar and salt* so that they can be used for diabetics as well as "low-sodium" cases. Sugar can easily be added as the food is served for the latter. When no such specialty store is available, the products can be ordered by mail and delivered by parcel post. (Appendix B, p. 94.)

Frozen Foods as sold commercially, are usually without added salt but some of them, such as sea foods, have a large content of natural sodium. Frozen green peas usually have about twice as much salt as the fresh peas. This is due to the fact that salt water is used in blanching them before freezing.

Nuts in their shells are of course unsalted, (except peanuts in a few instances). Shelled nuts as packaged in bags at grocery stores may or may not be salted. It is easily possible to detect the salt if it has been added. Unsalted peanuts are particulary good as a source of protein and as a tidbit to be eaten between meals.

Candies and Confections.—Most *chocolate* candies have salt as do those candy products containing nuts.

Soda Fountain Products (except certain chocolate products) have no added salt or soda, but often have considerable native sodium, particularly those containing milk or cream. Coca-Cola and ginger ale contain minute amounts of sodium and may be used by the patient on a low-sodium diet. Fruit ices, such as pineapple, lemon or orange, have very low sodium values and may be used as dessert even in very strict diets of this sort.

In general, the foods which are bought ready to serve or nearly so, are salted. The families of "salt-free patients" should consider the possibility of going back to the original sources. They can avoid added sodium by so doing; can save a good bit of money and can often get better food from the standpoint of mineral and vitamin content. Cracked wheat makes a splendid breakfast cereal, parched field corn which is then ground in a coffee grinder or some such mill makes a delicious hot cereal when cooked. Home-processed frozen food or home-canned garden products may be mentioned. Cornbread can be made with yeast instead of soda or with non-sodium ingredients as can various other cornmeal products. Homemade catsup, mustard, horse-radish and other flavoring products are made more cheaply than bought. Vinegar, flavoring herbs and spices for improvement of flavor are permissible and may do much to give variety and interest to food that might otherwise be monotonous. It is surprising how many flavoring sub-

stances may be used even in strict diets. The following are mentioned:

Allspice
Caraway
Cinnamon
Curry powder
Garlic
(but not garlic salt)
Lemon extract
Lemon juice
Mace
Mustard powder
(but not prepared mustard)
Nutmeg
Onion
(but not onion salt)
Pepper
(black, white or red)
Peppermint
Poultry seasoning
Sage
Saccharine
(but not Sucaryl-sodium)
Sugar, white
Thyme
Tumeric
Vanilla
Vinegar

All sorts of devices to give color, flavor and variety may be tried with profit.

In Appendix B, p. 94, will be found the names of commercial companies which produce and distribute foods low in sodium. These products are more expensive than similar commercial products but they are quite acceptable.

Canned Goods and other specialties processed without salt can be purchased at special diet stores or at counters in certain chain stores. As a rule they are without *both sugar and salt* so that they can be used for diabetics as well as "low-sodium" cases. Sugar can easily be added as the food is served for the latter. When no such specialty store is available, the products can be ordered by mail and delivered by parcel post. (Appendix B, p. 94.)

Frozen Foods as sold commercially, are usually without added salt but some of them, such as sea foods, have a large content of natural sodium. Frozen green peas usually have about twice as much salt as the fresh peas. This is due to the fact that salt water is used in blanching them before freezing.

Nuts in their shells are of course unsalted, (except peanuts in a few instances). Shelled nuts as packaged in bags at grocery stores may or may not be salted. It is easily possible to detect the salt if it has been added. Unsalted peanuts are particulary good as a source of protein and as a tidbit to be eaten between meals.

Candies and Confections.—Most *chocolate* candies have salt as do those candy products containing nuts.

Soda Fountain Products (except certain chocolate products) have no added salt or soda, but often have considerable native sodium, particularly those containing milk or cream. Coca-Cola and ginger ale contain minute amounts of sodium and may be used by the patient on a low-sodium diet. Fruit ices, such as pineapple, lemon or orange, have very low sodium values and may be used as dessert even in very strict diets of this sort.

In general, the foods which are bought ready to serve or nearly so, are salted. The families of "salt-free patients" should consider the possibility of going back to the original sources. They can avoid added sodium by so doing; can save a good bit of money and can often get better food from the standpoint of mineral and vitamin content. Cracked wheat makes a splendid breakfast cereal, parched field corn which is then ground in a coffee grinder or some such mill makes a delicious hot cereal when cooked. Home-processed frozen food or home-canned garden products may be mentioned. Cornbread can be made with yeast instead of soda or with non-sodium ingredients as can various other cornmeal products. Homemade catsup, mustard, horse-radish and other flavoring products are made more cheaply than bought. Vinegar, flavoring herbs and spices for improvement of flavor are permissible and may do much to give variety and interest to food that might otherwise be monotonous. It is surprising how many flavoring sub-

He may be very reluctant to have the boss know he is delicate, or to cause his hostess trouble. In other words, he must do the best he can and then make up for it later if it exceeds his tolerance. One does not like to single himself out as a special or peculiar case—when one is in Rome, he does as the Romans do.

Dinners served in one's honor can hardly be declined, nor even when served for one's friends. The sodium-low diet is awkward, to say the least. Caterers can hardly be expected to provide a special plate when their facilities are stretched to the limit. If the fellow on a diet is an afterdinner speaker, he can excuse himself from eating on the grounds that he speaks better if he does not eat before speaking. Many dangerous dinners may be dodged by failing to send a reservation and then coming in late for the program. Whatever the situation, it often happens that one's best friends are his worst enemies. "Oh, take some of this ham. A piece of good ham never harmed anyone." Johnnie Goodfellow can hardly be expected to understand the situation and anyway it isn't his health that is involved.

Eating at a restaurant offers less difficulty than might be supposed. Most waiters and proprietors are eager to help. They anticipate a generous tip perhaps, and they cherish the idea that having been served satisfactorily, the individual will come again and be glad to do so because he will not have to explain so many times if he becomes a regular patron. The restaurant customer who says, "No salt please, I'm on a deit," will nearly always receive the most considerate attention. As a matter of fact, the attention is sometimes so marked as to be amusing or even a little bit embarrassing, though it rarely need be the latter. If one eats regularly at a restaurant or hotel, special dishes may be prepared or even suggested by the establishment. As liberal a tip as one can afford will help to get good food at a later time. It *is* extra trouble of course for some one to serve special dishes.

Breakfast is usually easiest. Fruit, fruit juice, coffee, an unsalted egg. If one has his own salt-free bread, he can have it toasted and served with jelly instead of butter. He can usually get Puffed Wheat or Shredded Wheat Biscuit with fruit, cantaloupe, fresh or canned fruit. There is a fair choice of food for breakfast.

Lunch can be another breakfast, or can resemble the dinner described below.

Dinner.—Unsalted broiled chop or steak, unsalted French fried potatoes (may be seasoned with salt substitute carried in pocket),

4

"Eating Out"

It is easy to understand that the patient on a low-sodium diet is likely to do best when he is in his own home where his food is prepared by some interested member of the family who understands what is required and knows how to go about doing it. Many hostesses will find it difficult to supply a low-sodium diet on short notice. And yet it would be quite wrong to condemn the patient to a regimen which never permits him to be away from home. There are several possibilities. Some of the more likely ones are listed below:

1. The patient may eat only at home, or carry a lunch pail when he goes out.
2. He may simply miss a meal occasionally (when away from home). This is usually not a serious matter and may assist in holding down excessive weight provided he does not over-eat at the next meal.
3. He can carry his salt-free bread, his salt substitute, and such breakfast food as Puffed Wheat or Shredded Wheat.
4. He can request his hostess not to salt his egg or chop, and then can choose salads and fruits which would be safe, begging permission of the hostess, of course.
5. He can eat what the others eat and then do penance by being unusually conscientious for a few days. This is a dangerous course for cases which need to be very strict.

It is easy to say that one must not under any circumstances eat salted food, but there are times when it is most inconvenient to avoid doing so. If the boss is giving a dinner for his staff and his wife is in charge, an employee who wants to make a good impression and possibly get a promotion can hardly make clear his problem. He will just have to eat what is set before him and like it.

5

Originality and Ingenuity in the Low-Sodium Diet

It is said that the American soldier is a poor soldier from the standpoint of being willing to follow slavishly the arbitrary orders of a higher officer. That he is a most effective soldier for defeating the enemy is well known. This peculiarity is due to the fact that he acts best when he assumes the initiative and takes over the intimate details of the local problem which he can see and understand better than can the staff officer at the base. So it is in fighting the enemy which is our present problem. *Both* the staff officer (the physician) and the foot soldier (the patient and his family) are needed to win the battle. We shall do best when *both* understand the problem and *both* assume responsibility for the result.

Patients differ, physicians differ and conditions differ. Such being the case, methods of handling the patient must permit some flexibility and the patient's opinion or his preference may be most helpful provided he understands the whole problem and submits to the general plan of strategy. Suppose a given patient were told to eat an egg—unsalted—for breakfast, and it happens that he doesn't like eggs at all. If he suggested instead fried mush (made without salt) or French toast (made of salt-free bread and salt-and-soda-free batter), what would be the difference? There would be no great difference except that the patient is made far happier when he has some choice—a very important difference indeed.

Soup is much appreciated as an article of diet. But most soup is rather highly salted and eaten with salty crackers. Soup without salt is pretty flat and tasteless. Must the patient eat it so and be permitted no recourse? Let's see what can be done with a bowl of potato soup. (Potato soup is the acid test as it is very hard to flavor without real salt.) "Pass the crackers, please." But no! Nearly all commercial crackers contain salt and soda in the dough, and on most of them additional salt has been sprinkled. Yet

salad (most salad dressings contain salt), fruit plate, apple sauce, salt-free bread (two slices wrapped in waxed paper carried in pocket), dessert can be fresh or canned fruit, ice cream, coffee, tea, or "coke". There is enough variety so that one can eat out for weeks without repeating too much.

It is harder to get service help at a cafeteria than when one orders meals, but the opportunity to see the food may give one helpful suggestions. Salads, fruits, coffee, milk, tea or iced tea will be safe from added sodium and one can carry salt-free bread, nuts and other special things to his table after having been checked by the cashier. In some cafeterias one can ask for unsalted egg, (poached eggs are usually unsalted, and boiled ones always). The unsalted, dry breakfast cereals mentioned elsewhere will usually be available. The patient's salt-free bread can be toasted by request.

It will be seen that there is no insurmountable difficulty in eating out. As a matter of fact, without the advantage of such a "low-sodium" regimen the patient, in a large percentage of cases, might be bed-fast and unable to get out at all. He is very fortunate indeed to be able to go to a restaurant and may well overlook minor inconveniences.

Some planning and some restraint are required. One can hardly qualify as a gourmet, but he can get along very well and be happy in the thought that 95 per cent of the population of the world would gladly change places with him at the table.

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everyone wants crackers with soup. Salt-free bread diced and then toasted does very well as a substitute. Try heating these salt-free bread cakes with salt-free butter flavored to taste with garlic. Homemade crackers made of pie dough are described elsewhere, p. 45. Sometimes salt-free crackers or wafers can be purchased commercially.

A salt substitute helps the soup but must be used lightly as the bland taste of the potato permits the aftertaste of the substitute to come through. Onion, either raw or cooked into the soup, helps a great deal if one likes onion. Mango or green pepper cut up into the soup may give it a lift. Powdered cheese would help a lot but it contains salt. Only a little is needed and when the tolerance is fairly liberal it may be permitted in small amount. A few drops of vinegar or a dash of homemade salt-free tomato catsup or horseradish will make a lot of difference.

We hope the patient may be permitted to try—within the rules which he should thoroughly understand—to improve the taste of the dish before him. He will do much better than he will if he is simply given a tray with orders or implications that he must eat it as is and make no more trouble. It is the difference between being a freeholder at his own pleasant table or being a beggar on the back step.

When the patient is permitted so much freedom he must be very careful not to abuse it. The physician must be obeyed or else why have him? He must know what is going on. He understands the needs of the case and, therefore, must be in charge. A given patient found a "celery extract" which helped the taste of his salt-free soup tremendously—wonderfully indeed—and well it might because it was mostly salt and it was used liberally. Tomato catsup in salt-free bean soup makes it much better to taste, but commercial catsup contains a lot of salt.

"Low-sodium" patients must usually also consider calories. What can they do to cut down on sugar, for example, without eating unsweetened foods? Saccharine in coffee and tea is easily used, but it can as well be served on breakfast cereal, for example: It can be dissolved in the milk before the milk is added and does very well that way. If used on fruit the saccharine can be dissolved in water, a tablet to a teaspoonful, and kept on the tray to be used—a teaspoonful of the saccharine water instead of a teaspoonful of sugar. Or it can be dissolved in the juice of the fruit and then poured back on and thoroughly mixed.

The "low-sodium" patient is usually expected to drink "lots of water." He may feel unpleasantly "stuffed" with water. This can be relieved if very dilute lemonade or iced tea is served. These drinks may be sweetened with saccharine so as to avoid calories. It is much easier to take large amounts of water if it is cool rather than ice cold. Water should be kept conveniently at hand in a thermos bottle rather than make it necessary to ask the nurse or attendant to get it each time. Coca-Cola and similar soft drinks can be used instead of so much water.

When candy is to be served it is easy to provide gum drops for the man on a diet while bon bons are provided for the others. The gum drops have flavor but not many calories.

The patient and family can be helpful by keeping conversation at mealtime on pleasant subjects with the fewest possible references to the limited diet. After all, salt plays only a minor rôle in enjoyment unless one broods about his lack of it. It is impossible for the physician or for this manual to cover everything. Rules are necessary and they are good, but it has been said that rules are something to use "when the brains run out." We hope the patient and his family will be very active in thinking up new regimens and at the same time keep him both safely on his diet and keenly interested in living and in getting as much enjoyment out of life as may be possible.

6
The Psychology of Dieting

WHETHER or not a strict special diet is a burden to the patient and his family depends upon the mental attitude of the patient, his family and his friends. Its effectiveness also is dependent upon this. It is a well-known fact that the enjoyment of food is an important factor in good digestion, while lack of interest in, distaste for, or disgust with food is a big handicap. It is admitted at once, that other things being as they were, the person assigned to a special diet would rather not be under such restriction, but other things are not as they were by any means, his former way of living has indeed made him ill—hence the diet.

Such being the case the modern cardiac or high blood pressure case is very fortunate indeed, if he can have the advantages of a low-sodium diet. He should thank his lucky stars that medical science has worked out such a diet; that his family is willing to go to that much trouble for him; that modern commercial enterprises have made it possible for him to buy many of these special foods at the grocery store. He is like the diabetic who is fortunate in having insulin, or the man with weak eyes who has well-fitted glasses which he will probably be required to wear for the remainder of his life. How infinitely better the results of treatment are now than they were even a short time ago!

The most elemental lesson in this matter of attitude is that the low-sodium diet is a very great privilege to this particular person. Eating should always be regarded as a privilege rather than as a duty. It is only by contrast with the sumptuous dinners eaten in the past that the patient has any reason whatever to be discontented. But those same sumptuous dinners were probably at least partly responsible for his condition. While he is comparing his dinners now with those of the past he should also compare the efficacy of treatment for his type of heart disease with that of the days when dropsy and shortness of breath were the lot of the cardiac far more frequently than they are today.

One spends only about half an hour a day in eating. What is half an hour as compared to the whole twenty-four? One can still enjoy the conversation and the social and family mealtime relations. Many foods do not need salt at all, others do very well without it, and the substitutes for salt help a lot with the remainder. One must learn to disregard the little lack and set his mind upon the very great fact that before him is food that is still wonderful though certainly not a gourmet's delight. No one has a better right to "count his many blessings" than he who has need for such a diet, and who can partake of a carefully planned "low-sodium" meal.

The mental attitude of the patient will be improved enormously if he does not dwell on his deprivation, his troubles, his loss "of the good things of life." After all he has lost only one of the many, many such good things. He must try other combinations, discover ways of covering up the "aftertaste" of his salt substitute, develop other things than salt to give the savor which he likes. A bite of meat was insipid, but a small amount of scrapped apple added to it did the trick. Bean soup was flat and a few drops of vinegar helped. Potato soup seemed tasteless until a portion of *rancid* salt-free butter gave it a cheese-like flavor. A large slice of onion in a saltless hamburger made a lot of difference. Watching a redbird on the lawn made a patient forget everything else including a meal that was not exactly exciting. Snatching glances at a lovely poem helped another lunch. After all, there is "nothing good or bad but thinking makes it so."

The patient who simply gives up and accepts frustration is very foolish indeed. Let him or her and the family give a lot of thought to the problem of devising new and safe foods, of finding better ways of gaining the desired end, of understanding the problem.

The psychology of the family of the cardiac or hypertensive patient is also very important. In particular, that of the housewife—if she is the one who prepares the food—is utterly vital. If she resents and objects to the "extra bother," the patient is likely to say, "Oh well, I'll eat what you have." The preparation of a special diet is admittedly extra trouble, but the care of a sick person in any sort of an advanced stage (such as might develop without the diet) would be a great deal more trouble. Once the requirements are understood and a few adjustments are made an additional fifteen minutes a day in a well-regulated kitchen will usually suffice. There is a slight additional expense for salt-free bread, salt substitute and special items bought at dietary counters,

but the far simpler diet which one uses otherwise, often constitutes a small saving unless one is forced to send away for all his special items. The simple foods home-prepared are not only cheaper but they are also better for our present purposes and for other reasons.

It is easy to see why the family should accept the situation with the best grace and the least complaint possible. Certainly they must do nothing to make the patient feel that he is a burden to the rest of his household.

Friends can do much to keep the patient happy, or they can destroy his morale and make him very unhappy with his lot. They simply must not invite him to or expect him to eat dinners which he should not eat, nor make him uncomfortable with his special diet.

The man on a diet will simply have to learn to get his enjoyment from other things than food which contains sodium and activities which involve muscular activity, but he or she is usually a person past middle life and should have learned some hobbies and diversions. He simply must not keep his mind fixed on the limitations of his diet or on his troubles, He should contemplate his good fortune in being able to live longer and feel better as a result of his use of this special diet. The author of this manual is absolutely sincere when he says that he has never enjoyed food so much as since he has been on a successful low-sodium diet—moderately strict. It is because he really appreciates his food whereas he had formerly eaten without thinking about it; simply taking good food for granted. He now knows that eating good food is a very great privilege.

7

Errors and Penance

The individual for whom a low-sodium ("salt-free") diet is prescribed must be very conscientious about the food and the behavior which have been imposed upon him by his physician.

He must understand the problem, must study his food supplies, must know what the warning signs are, and then must *assume responsibility for himself.* If he is going to act like a spoiled child who must have everything as he wants it and when he wants it, there will be serious trouble ahead.

In spite of everything there will likely be times when he will get out of bounds. Sometimes it may well be unavoidable. One may partake of food with a fairly high native sodium without knowing it, or may believe that food is salt-free when it is not so. At times it will be inconvenient or embarrassing to adhere to the exact letter of the diet. There is no need to make one's self more uncomfortable than is absolutely necessary, provided he is willing to make compensation as promptly and as completely as may be necessary to correct the deviation from the strict diet which he must ordinarily follow. He is more likely to adhere to the *spirit* of the diet if he is permitted a bit of leeway as to the exact letter of it. In case the patient comes to a state of open rebellion all is likely to be lost.

In saying these things it is very important that we take into consideration the sodium tolerance of the patient in question. If he is on a tolerance of 500 milligrams or less his problem is much more difficult than if he is permitted 1000 or 1500. It is a mistake to make the sodium restriction more stringent than is really necessary. Why hold to a 500 milligram restriction when 1000 is all that the case requires? It is mostly by experimentation that the patient learns, with his physician's approval of course, what he can or cannot eat. If a course of action causes no untoward symptoms it is evident that he is within tolerance, or that tolerance has been raised as a result of the careful control that has been exercised.

An overindulgence can often be anticipated. If one knows that he is to be a guest at a dinner where he will be expected to eat what is offered, he can bear down on his allowance of sodium for a day or two before; sometimes he can be discreet in the choice of food at the dinner; maybe he can appear busier at eating than he really is. After an overindulgence it will help if he will sharply cut his intake of sodium and greatly increase the intake of water so that the salt may be washed out as speedily as possible. Obviously also he should be careful at such times to avoid any unusual physical effort that might put a strain upon the heart.

The subject should study the mistakes he makes to the end that he may avoid future slips. The following episodes will illustrate the fact that it is very easy to trip:

1. The label on a can of hominy said, "packed in clear water." This seemed to indicate that salt had not been used in the preparation. Both the housewife and the patient had forgotten that *sodium* had been used in removing the covering of the grains of corn. The patient gained 3 pounds promptly.
2. Tea, nuts, and canapes were served at a reception. Thoughtlessly a low-sodium patient took some nuts and a tiny sandwich. He gained nearly 2 pounds.
3. While living away from home a patient drank water from a tap in a town with high sodium content water. He should have sent down for bottled water which was offered gratis for the guests.

8

Body Weight in Relation to the Low-Sodium Diet

MANY patients on a low-sodium diet are heavier than they should be. Obviously every pound of extra weight puts an additional burden upon the heart:

1. One has just that much more weight to carry about.
2. The additional tissue must be provided with circulation, and the heart has more work to do because of it.

An overweight cardiac or hypertensive patient has then *two* objectives—to lose *salt* so that he will not retain so much water, and to lose actual *fat*. The loss of fat will also help him to lose water because fatty tissue retains a great deal of water.

Two ways are offered the healthy person whereby he may lose fat. The first and most obvious one is by such a change in his dietary regimen as will reduce the amount of fat, or fat-producing foods taken in. The other is by increased muscular exercise which will "work off" the fat. It is obvious that the cardiac case can hardly be expected to make use of the latter method and so he must consider the other very carefully. Every possible means must be taken to hold down the consumption of fat and the fat-producing foods.

Yet these people get hungry in exactly the same way as do others and hunger is an unpleasant sensation which is fundamental in determining behavior. The individual who regards the enjoyment of eating as being something akin to improper indulgence is taking a position which is most unreasonable. One must not be a pig, to be sure, but every normal person enjoys the eating of food, and it is right that he should do so.

The following remarks will be confined to practical suggestions which we hope will be useful to laymen, and not to a theoretical or detailed discussion.

The Low-Calorie Diet.—The energy value of food is measured in calories. Two lists of foods treated on this basis are as follows:

High-calorie foods (concentrated—rich) to be avoided for the most part.

Fats of all sorts—butter (or oleomargarine), cream, ice cream, fat meat, fried foods, pastries, salad oils, mayonnaise.

Sweets—candy, cake, cookies, soda fountain confections, preserves, jellies, jams, sugar (on cereals or in coffee), honey, pastries.

Low-calorie foods recommended in this diet: All of the following are rich in vitamins and minerals.

Vegetables—particularly green vegetables, cabbage, lettuce, Brussels sprouts, cauliflower.

Roots—turnips, carrots, parsnips, rutabaga, beets.

Fruits of all sorts in fresh or unsweetened condition.

Melons of all sorts.

To the extent that the patient can or will avoid the first group and emphasize the second group in his menu, he may be expected to lose fat over a period of time. It will be necessary too, that he resolutely push back from the table before he has completely satisfied an excessive longing for food and his enjoyment of the same. It may not be easy to do this. No one likes to be hungry or to leave the table unsatisfied. To a considerable extent, however, the practice of remaining at table until one is surfeited is a habit and it can be broken. Indeed, it must be broken if one is to avoid such a definite tendency to become obese as is observed in many people as they grow older. The individual who likes to eat too well will need to cultivate other interests than those having to do with food and its enjoyment.

The Low-Fat Diet.—The fat of the various species of animals and of man is of essentially the same composition. The obese individual does not need fat in his diet inasmuch as he already has it in excess in his own body. A balanced ration is one which contains all of the various ingredients—proteins, carbohydrates (starch and sugar) and fat. If then, the individual having an excess of fat in his body will simply reduce the amount of fat in his diet, he will not disturb his nutrition. He should trim off the fatty portions of meat, use little or no butter or oleomargarine, go very light on fried foods, pastries, and cakes, avoid mayonnaise and rich salad dressings. In doing this he may seriously reduce the amounts of vitamins A and D which he receives and possibly should supple-

ment them with a concentrated product. At the same time he may increase the use of fruits and vegetables which are not fattening, but are rich in minerals and vitamins.

The Low-Carbohydrate Diet.—When starches and sugars are not used up for the purpose of supplying energy to the body they are stored in one or the other of two principal forms—as glycogen in the liver and in the muscles, or as fat in the tissues. The first of these storage products (glycogen) gives us no difficulty; the second (fat) is the product under present discussion. The subject divides itself again into two headings as to source—*sugars and starches.*

Sugar of any sort is easily digested and assimilated. It enters the circulation rather promptly and one of four things may happen to it in the tissues:

1. It may be *used* as a source of energy.
2. It may be *excreted* in the urine.
3. It may be *stored* as glycogen (of little importance here).
4. It may be *converted* into fat and stored as such.

Candy, cakes, pastries, ice cream and rich desserts are fattening mainly because they contain so much sugar and/or fat. Much can be done toward reducing by cutting down on the sugar used in coffee, tea and on cereals. Saccharine can be conveniently used in lemonade, in coffee and in tea; it also does very well over breakfast cereals if the saccharine is dissolved in the milk before it is poured over the cereal. As it is commonly prepared, a tablet ($\frac{1}{4}$ grain) of saccharine is approximately equal in sweetening power to 1 teaspoonful of sugar. It has no food value and is for that reason not fattening, nor nourishing; nor is it harmful. Some people object to the taste, saying that is is bitter rather than sweet. Flavor will be greatly enhanced if a little bit of sugar is used with the saccharine. As much saccharine as is usually indicated plus one-fourth the usual amount of sugar does very well indeed and has a better flavor than saccharine alone. The continued use of saccharine even in rather large amounts is entirely harmless.

A new product, Sucaryl, is recommended as a substitute for saccharine. It *cannot* be used, however, by the low-sodium patient because it is *sodium cyclamate* and contains a considerable amount of the element he must avoid.

Starch is fattening if much of it is eaten for the very good reason that the starch is changed to sugar in the process of digestion. The

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9

The Use of Sodium Compounds in the Processing of Foods

THE food manufacturer wishes his product to be just as attractive and as tasty as it is possible for it to be made, and feels quite justified in using any harmless method which may enable him to put out a better or more attractive product, or to make it cheaper. He is required by the federal and state government to come up to certain standards, but as a rule these are not too rigorously administered provided the contents are declared on the label. The following sodium compounds are often used commercially in processing food.

Salt.—A short inspection of labels will soon show that *salt* is used in nearly every processed food which is packaged and placed on the shelves (canned fruits usually excepted). What can be the harm in adding salt? For the great majority of people there is no harm, but this practice may complicate the problems of the person on a low-sodium diet. Particularly is there danger when the patient or the person who prepares his food is unaware of the fact that salt has been added. Such persons must learn to read the *fine print* on the label. Frozen foods are supposed to have no salt added, but some companies blanch the food (particularly peas) in *salt* water before freezing. This practice will increase the sodium content considerably.

Soda and Baking Powder.—These products, both containing baking soda ($NaHCO_3$), are used in all manner of cookies, cakes, flour mixes for quick preparation of muffins, rolls, cornbread, pancake batters and the like. Again we must emphasize the fact that this form of sodium is just as bad as salt, though most of the products mentioned also contain salt.

Di-sodium phosphate (Na_2HPO_4 may have been added to cereal to make it cook quicker. When the word "Quick" is used in the label, or when any other word of the same meaning is used, it will

sugar then behaves exactly as discussed above. Starchy foods, which should be avoided if one is trying to hold down weight, are: potatoes, bread, crackers, macaroni, spaghetti, and related products.

Obesity due to other causes than excess of salt, fat or carbohydrates, should be treated in such a manner as is indicated by the proper cause. The advice of the physician in charge is indicated in these cases, and in every case when for any reason a drastic reduction in weight is contemplated.

Artificial Flavors.—A wide variety of artificial flavors are added to various foods. Some of them have sodium as a part of the chemical formula and these should be avoided when it is possible to know of their presence. *Monosodium glutamate* is used by chefs to enhance flavor. The low-sodium case may substitute monoammonium glutamate if he wishes.

Sodium alginate is sometimes used as a stabilizer in ice cream and in chocolate milk. The amount used is not great but might be significant especially inasmuch as milk products are rather high in native sodium. *Sodium citrate* is used in the same way in evaporated milk and jellies. *Sodium propionate* is used to inhibit the growth of molds in cheese, bread and cake. *Sodium acid phosphate* may be used to acidulate various products.

Other Sodium Products Used In Processing Foods.—There are doubtless other processes of interest in the present connection, but they present technical aspects with which we can hardly expect to cope in this place. Insofar as possible the "sodium-low" diet should depend on *non-processed foods*, particularly if the diet allows the patient less than 500 milligrams of sodium per day. Once he has found that a particular choice of foods is safe, he should introduce new and untried foods slowly and watch his weight after having made such changes. Enough has been said to show the "sodium-low" patient that here much more is involved than the mere avoidance of the salt shaker. Eternal vigilance will be the price he must pay for health and comfort. But health and comfort are well worth the effort.

be well to read the label closely (fine print) to see if the word "sodium" is used. If it is used, the person on a strict low-sodium diet must avoid the product, or at least take it into consideration in computing his diet.

Sodium sulphite (Na_2SO_3). Many foods have a better appearance after they have been bleached. One of the commonest bleaches is sodium sulphite. Dried apples, dried peaches, dried apricots, hominy, may be mentioned as examples of foods which may have been treated. When the fumes of sulphurous acid are used instead of sodium sulphite there is no objection to bleaching from the standpoint of the sodium-low diet.

Sodium hydroxide (NaOH) is used in processing certain foods and some of the sodium may be retained to a small or possibly a large extent. When hominy is prepared the washed corn is dumped into a vat of rather strong lye (sodium hydroxide). This softens and removes the outer covering of the grain, but some of it also soaks into the grain itself. The softened corn is then washed so that most of the sodium, but by no means all of it, is removed. Hominy, canned hominy and hominy grits contain rather large amounts of sodium. Canned peaches are processed by dumping them into the same sort of a solution to remove the skin. Probably most of this is removed by washing, but some may remain in the fruit in combination with the fruit acids. Apples have often been sprayed with some sort of poisonous product which may remain on the skin. Usually this is removed by washing the apples in a neutralizing solution which removes the poisonous spray, but to do so it must also remove the native wax on the apple. This solution often contains *sodium hydroxide* (to dissolve the wax) and some of this may be left on the apple. If the patient has a very low-sodium tolerance, the apples should be peeled or carefully washed before he eats them.

Softened Water and Water Containing Natural Sodium.—These are discussed in detail later, p. 77. Such waters when used in processing foods add to the sodium content of the food.

Preservatives.—*Sodium benzoate* and *sodium salicylate* have been used very much as preservatives but are now illegal except in small amounts in commercial foods which are liable to spoilage after being opened. Even then they must be declared on the label. They are used very little except by certain home canners. Their use in any case is questionable. Certainly they should not be used for the person on a low-sodium diet.

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10

Suggestions for the Preparation of Low-Sodium Menus

For the suggestions which are offered in the following pages, the author is deeply indebted to his wife who has shown great interest and ingenuity in devising sodium-low foods, and in adding variety, zest and taste to the menus which she has prepared. She started in this endeavor without previous experience or training in the preparation of special diets, being a housewife with a family and the myriad tasks which all such women must constantly attend. All of the devices mentioned in this chapter have been tried out on many occasions and they work. None of them are particularly difficult; none of them require a great deal of trouble though to be sure they do make some extra work. They can be carried out by any intelligent housewife who has a reasonably modern kitchen and such an allowance for food as she would need for any well-nourished family.

We are eager to have it understood that the various plans mentioned herein are in no wise exclusive or that they represent any unusual ingenuity; they are simply the application of common sense and a bit of very elementary chemistry to the special problem which the housewife has when she is told that a member of her family will do much better on a low-sodium diet. Our excuse for offering these devices is that we have been able to find very little of this sort of practical kitchen help, and believe that the literature on this subject which is offered for the instruction of the layman is very deficient. There are a great many housewives who by being helped in this way may soon help themselves, and so make real progress in the handling of such cases, under the direction of the personal physician, of course.

We are eager to make it clear that these suggestions are not offered as recipes *à la* cook book. A re

to make a product which will please everyone, or nearly everyone who may try it. In the present usage it is intended as a frame on which may be prepared a dish for one person. His needs from the standpoint of sodium, his whims, his special likes and dislikes, his tastes are concerned. Every possible opportunity must be taken to change the recipe to suit the particular person for whom it has been prepared. Since this person is more or less ill, and has requirements which are not too comfortable at the best, he is in real need of cooperation.

Substitutes For Salt, Baking Soda and Baking Powder.—There are a number of excellent substitutes for table salt to be had at drug stores, and special food stores. They are harmless except that persons putting out little urine must avoid those substitutes containing potassium as most of them do. While none of the substitutes tastes as good as salt, they are definitely better than nothing in most instances.

Ordinary baking soda ("soda") is sodium bicarbonate. As a substitute *potassium bicarbonate* will do just as well and can be used in exactly the same way and in the same amounts. It is harmless except for patients with poor kidney function.*

Baking powder is a mixture of baking soda and some acid salt. The only substitute for it that we have found is that sold under the Cellu brand (Chicago Dietetic Supply House, Inc., Chicago, Ill.). Ask for "Sodium-free Baking Powder," and use it exactly as other baking powder.

BREADSTUFFS

Bread.—The making of bread with yeast-leavened dough has become to some extent a lost household art, but with compressed yeast on sale at every grocery store, and with modern ovens it is by no means difficult. Many families will enjoy the change from commercially baked bread. Some of the batch can be baked separately and salted in the usual way, while a particular loaf is seasoned with a salt substitute. Salt-free dough once it has been made can be wrapped in waxed paper and stored in the refrigerator

* The author has found that most druggists do not carry potassium bicarbonate in stock, but they can order it and have it in a very short time. The drug clerk is very prone to explain that it is essentially the same as *sodium* bicarbonate as is indeed true for almost every other purpose. By no means must his sales talk influence the patient into accepting the sodium bicarbonate.

for several days and then it can be baked as needed at a later time. When the time comes to bake it, the dough must be removed from the refrigerator to a warm place, so as to allow the yeast to grow (to double volume) before the baking process is begun. Most people living in large cities can arrange for buying "salt-free" bread, or can buy it in cans from certain companies selling special foods. Ceremonial breads, such as Passover matzoth or breads prepared in the unleavened manner for the purposes of the communion service, can be used. Rye, whole wheat, and other special breads can be made in the same way as white bread by simply changing the flour used. The adding of salt substitute to the surface of salt-free bread will usually help the taste of it.

Rolls.—The same dough used in making bread can be made into rolls of a wide variety. They can be rolled and stuffed with nuts, or covered with a syrup as they are baked; they can be rolled with fruit of some sort before baking; they can be spiced with acceptable sodium-low spices; they can be made in fancy shapes, and dressed up in a myriad ways to the end that the person who must have food of this peculiar sort may somehow get the idea that he is a treasured person and that his family is glad to go to some trouble for him. There is an added zest in food which has been made with loving hands. Such evidence of love and affection which is much appreciated by those who may need to be restricted a bit in regard to diet.

Biscuits.—Excellent biscuits may be made over the usual recipes with non-sodium "baking powder" and a salt substitute. The uninitiated diner won't know the difference.

Muffins.—By adding blueberries, nuts, spices, etc., wonderful low-sodium muffins are made with a somewhat thinner dough baked in an appropriate pan.

Cornbread.—Excellent cornbread can be made over the same recipes as has been used before except that a salt-substitute is used instead of salt, "non-sodium baking powder" or "potassium bicarbonate" is used instead of baking powder or soda. Theoretically somewhat more of the substitute should be used, but the usual amounts do very well.

Pancakes.—Commercially prepared pancake mixes cannot be used unless they are specifically marked "low-sodium," but batter can be made in the old-fashioned way without leaven, or it can be mixed using the various substitutes mentioned elsewhere.

Salt-free (waffles, pancakes, French toast) batter can be made without any form of baking powder as follows:

1 cup of flour
1 egg
3 egg whites
3 tablespoonfuls of salt-free shortening
$\frac{3}{4}$ cup of milk
$1\frac{1}{3}$ teaspoonful of sugar

Combine egg, milk and sugar—add flour and stir until mixture is smooth. Beat egg whites until very stiff. Fold the beaten egg whites into the batter and fry in a griddle greased with salt-free shortening.

A 4-inch pancake contains about 35 milligrams of sodium when made in this way.

Waffles.—The pancake batter mentioned above can be prepared in a waffle iron as easily as in a skillet.

French Toast.—Salt-free bread may be fried in the batter mentioned above and makes excellent French toast to be served hot with syrup. This is an excellent way to use salt-free bread which has become dry or stale.

Pie.—Fruit pie-filling will contain very little sodium, but custard, pumpkin and many of the open-faced pies contain considerable sodium even when no salt is used in them. Dough used in making pies does not need a leavening agent and can either be made without salt of any kind, or with a salt substitute. The family will not notice the difference if the housewife can make good pie crust in the usual way.

Crackers.—Various kinds of crackers can be had without salt, but most of them are not very good. If they are not well-liked the housewife can make home-baked crackers in her own kitchen. Simply make a *pie dough*, roll it out flat and bake it in shallow pans after scoring with a knife so that the baked product will break into squares. Such crackers can then be stored in tight cans and used as needed. Crackers made in this way will make unsalted soup seem much more attractive, and soups in the sodium-low regimen need every bit of help they can get.

It is not entirely clear to the author why crackers, bread, rolls and similar products which are "salt free" could not be made quite acceptably by commercial companies by using substitutes for salt, soda and baking powder but as yet he knows of no such efforts. They would be slightly more expensive, to be sure, but should be definitely more palatable.

Dressing.—Dressing for the chicken, turkey, or other meat can be prepared in the usual way using salt-free bread. A dressing placed over a chop and then baked or broiled in the oven makes a

delightful plate, attractive in appearance and quite tasty with a salt substitute instead of salt. It is a good way to use the salt-free bread which has accumulated. Very likely the family will not know the difference if you will use real salt on their portions, while a salt substitute is used for the one member who is given special consideration. It is an excellent way to use dry salt-free bread.

Cakes.—Most cake recipes can be followed with good results using the substitues mentioned. Angel food cake does not need either salt or a leavening agent. Chocolate cakes are taboo because most chocolate contains salt.

Cookies.—Try your favorite recipe with the substitutes. Some will do better than others to be sure. Practically all commercially baked cookies have both salt and soda in rather large amounts and may not be used by the sodium-low case.

BREAKFAST FOODS

Prepared Breakfast Foods.—Nearly all of the prepared dry breakfast foods which are eaten with milk and sugar have salt added in considerable amount. There are at least four, however, which may be eaten safely. They are "Puffed Wheat," "Puffed Rice," "Shredded Wheat," and "Muffets." There may be others but the author has not found them.

Cooked Breakfast Foods.—Most of these products, such as rolled oats, Ralston, Cream of Wheat, Farina, Wheatena, and the like, have no added salt and are excellent. In choosing these products it is better to avoid those which have been treated so as to cook quickly.

Home Prepared Products.—Ordinary wheat can be bought in its natural state and then cracked or ground in some way. Such a product cooks slowly, but this can be corrected by soaking it in water overnight. Raisins, dates, or figs added to the mixture before cooking will make it better for many people, and will add only a little sodium. Salt substitute may be used of course. Dry field corn or sweet corn can be parched and then cracked or ground and used in the same way. Fried mush made from the native meal with salt substitute is excellent when eaten with syrup. Fried Cream of Wheat porridge is essentially the same as fried mush. Commercially prepared mush for frying will usually contain considerable salt.

Breakfast Rolls.—Some bakers make a breakfast roll from yeast-leavened dough with little or no salt added. Ask your baker about

his product, or prepare your own as described under the "Breadstuff" section, pp. 43–46.

Eggs.—The use of eggs will be discussed elsewhere, p. 49. They can be "salted" with a substitute.

Bacon.—Why not use fresh side meat or a pork chop ("salted" with substitute) instead of bacon?

Sausage.—As sausage is prepared by the butcher it has large amounts of salt. Why not buy lean pork and have the butcher grind it before your eyes and then "salt" it yourself with a substitute? Use sage and other herbs to flavor.

Pancakes, Muffins, Waffles, Hot Biscuits, etc., have been discussed, pp. 44, 45.

GRAINS AND LEGUMES

All of these foods do pretty well in the low-sodium regimen. Beans tend to be a little high in sodium, but not dangerously so if used in moderation. After they have been processed in some way we can be pretty sure that they have gained in sodium content, and so the various canned bean products had better be avoided. The same may be said of the many kinds of foods made from meals and flours coming from grains and legumes. An excellent peanut butter can be made, however, from personally shelled unsalted peanuts which then are ground in a food grinder, "salted" with a substitute and a little peanut or salad oil added to improve the consistency of the product. A raw unsalted peanut butter is available, but many people prefer the butter made from roasted nuts.

Rice is an excellent food for the low-sodium case. The exclusive rice diet (Kempner) is even prescribed for some hypertensive cases. *Barley* may be added to soups. *Wheat* and *corn* products have already been discussed under breakfast foods. *Peanuts* (unsalted) make an excellent source of protein and are well used as a tidbit between meals if the patient becomes restless because of hunger.

MEATS AND MEAT DISHES

It must be borne in mind that *all of the animal products* tend to be rather high in native sodium even though they are not salted at all. Such being the case they must be used sparingly unless one is on a rather liberal diet. The protein of meat is, however, most useful, and for many people a satisfying diet must contain some meat. The meat should be used in such a way as to go as far as

possible in giving satisfaction to the eater. Fish are permissible, but the fresh water fish are generally lower in sodium than those which have lived in the ocean. None of the shell-fish should be used unless it is oysters, concerning which there is controversy. Some sodium content tables rate oysters as rather low in sodium while others give a high content. In such a case, oysters had best be eaten only by persons on a rather liberal diet and then they should watch the effect upon the weight as taken the next morning.

Baked, broiled or fried meats will have higher flavor than do boiled or stewed meats unless the latter are boiled or stewed with something that will add flavor. It is easy to see why this should be so. Baking concentrates the juices while boiling dilutes them. Since the sodium-low diet tends to be too bland to the taste, every effort should be made to overcome this objection. The use of the various meat sauces are not permitted as a rule because they are commonly rather heavy with salt. It is true that they are used in small amount but even so they add significant amounts of salt. All sorts of powdered or grated herbs can be used without objection—curry, rosemary, marjoram, sage, thyme, horse-radish (if only containing horse-radish and vinegar), home-prepared mustard, homemade tomato catsup, pepper and the like.

Many dishes contain only a small portion of meat and yet can be made very tasty as meat dishes. We mention goulash, creole steak, chili (using red pepper instead of chili powder which contains salt), Spanish rice, and a wide variety of meat and vegetable stews. Meat loaf can be made with salt-free bread, corn meal and the like, and after being seasoned with salt substitute makes an excellent sandwich meat. The commercial sandwich meats are all rather highly salted. Chicken or meat pie can be made with salt-free and soda-free pie crust and flavored with salt substitute. Rarely will the remainder of the family notice the difference between this and the usual dish made in the customary way with real salt.

We have already mentioned the fact that sausage can be made from unsalted pork. Hamburger steak is usually unsalted but if there is the least doubt about its quality it should be bought as steak and ground at the time. The reason for this is found in the fact that hamburger tends to turn dark as it gets older. To prevent this sodium sulphite is sometimes added to the product. For obvious reasons hamburger which is bought at the week end (Saturday and Monday) is particularly likely to have been so treated.

Canned meats, sandwich meats, cured meats, and highly processed meats of any sort are not for the individual on a low-sodium diet. He will just have to forget about them.

Egg.—The protein of the egg is very much like that of meat and is excellent food but has significant amounts of native sodium. Eggs can be prepared in many attractive ways and are usually individually served and salted to a particular taste. After a few weeks of eating unsalted eggs the patient will not notice the absence of salt or salt substitute.

MILK AND MILK PRODUCTS

In the use of these products we have much the same problem as in the case of other foods of animal origin. Milk is rich in vitamins, contains needed minerals, is easily digested, easily excreted, and is the best source of protein, but *it is also rather high in sodium.* Milk may be taken in moderation if one remembers this significant fact, but it cannot be indulged in liberally by the low-sodium patient. Whether salt is added from a shaker or not is of little importance, the milk itself contains about 500 milligrams of sodium to the quart; a glass of milk then is about 125 milligrams and that is certainly a very significant amount for many people. Some cheese is salted in the processing, and other cheese is not; but *all cheese* is made from milk and that is why all cheese has a rather large amount of sodium. Some of the processed cheeses have a great deal of additional salt, of course. Swiss cheese is usually the lowest in sodium but still contains about 125 milligrams of sodium per ounce.

It is possible to buy milk powders from which the salt has been removed, but these products are rather tasteless and are of low vitamin content unless other flavor and vitamins have been added. These powdered dialyzed milks can be purchased at a drug store. They are excellent sources of protein, but not very exciting to the person who likes highy flavored food. Homemade cottage cheese can by dialyzed by putting it in a cellophane bag and suspending it in running water for a few hours. At the end of the time the sodium is gone but so are the vitamins and the taste. Taste can be restored somewhat by mixing with pineapple, pear, peach, jelly, cinnamon, chopped fruit, etc. but the results are not too inspiring.

Butter can still be made from cream just as our grandmothers made it. Whipping cream can easily be churned with an egg

beater. It can then be "salted "to taste with a substitute, or can be left unsalted. Unsalted sour cream butter can be obtained at any kosher market. Many people will not like the taste of the sour cream product. In some communities unsalted sweet cream butter can be obtained. Unsalted butter on unsalted bread is pretty flat but can be improved by adding jelly or preserves. In such a combination, however, it might be as well to leave off the butter entirely as it is rich in those calories which most low-sodium patients would do well to avoid when easily possible. Unsalted butter does very well on baked potato, sweet potato and hot rolls.

Unsalted butter tends to become rancid rather rapidly and for that reason should be kept in the coldest part of the refrigerator. If it does get old it tends to develop a "cheesy" flavor which makes it useful for flavoring such products as soups. It should be saved in a closed vessel and used for this purpose if such is found to be agreeable. It becomes then a substitute for powdered cheese which is usually very high in salt. There is no objection to mixing salt substitute with the unsalted butter.

Buttermilk has about the same amount of sodium as does fresh whole milk. Cultured buttermilk usually has about 35 per cent more salt than fresh or churned buttermilk. *Chocolate milk* contains even more than the usual amount of sodium. *Ice cream* contains sodium by virtue of the amount of milk it contains; frozen custards, ices and sherbets contain less because they have less milk in them. They are also lower in caloric content and make excellent desserts. A *milkshake* contains about as much sodium as a low-sodium meal, and indeed makes an excellent small meal when one is a bit pressed in the matter of obtaining a lunch or a dinner. It would not be a diet for regular use but does very well in an emergency. Sodium alginate is sometimes added to ice cream and to chocolate milk as a "stabilizer."

The amount of sodium in the cream used in coffee, in cooking, or over cereal is so small as to be negligible except for the patient on a strict low-sodium diet. It is interesting to remember that there is less sodium in cream than in milk—but there are a great many more calories in cream. Most sodium-low patients need to consider both sodium and calories. Persons on an extremely low-sodium diet may need to avoid milk products altogether, or resort to those from which the sodium has been extracted such as can be bought at most drug stores.

VEGETABLES

The natural sodium in vegetables is rather low except in those usually designated as "greens" and in the true *root* vegetables, such as turnips, carrots, parsnips and the like. The vegetables which grow underground but are really modified stems are definitely lower in sodium—onion, artichoke, potato, etc. Practically all canned vegetables as found in the grocery have salt added, but most of the frozen ones do not. If salt has been added to the commercial brands of frozen vegetable, the fact should be declared on the label. Home canned products need not have salt added, nor should they have sodium benzoate or sodium salicylate added as a preservative if they are to be eaten by someone on a low-sodium diet.

Usually a rather large amount of salt is added to vegetables in cooking or at the table, and they may taste pretty flat without much seasoning. Unfortunately the salt substitutes sometimes have a considerable aftertaste which may be objectionable for a time. This is particularly true of those vegetables, such as potato, which are rather bland in taste. After a time, may persons on a diet of this sort will prefer to use no salt substitute at all. Sweet potatoes are commonly served without salt and several others of the highly flavored vegetables (onion, carrot, parsnip) do quite well without it, or with a salt substitute.

Potato.—Inasmuch as the lowly potato is a major article of diet for many people we shall give particular attention to its preparation. The general principles set out will apply to many other vegetables. Potatoes served according to the following suggestions can hardly compete in flavor with those that are salted but they are not too bad; they are cheap; and they are definitely worth a try.

If potatoes are *boiled or baked* in the peel, the skin of the potato will give an added flavor which will be agreeable and will be less bland. Baked potatoes have the flavor enhanced by the cooking, while boiling will dilute the flavor.

Fried potatoes do very well indeed, especially *French fries.* As served in restaurants and public eating places with a broiled or grilled steak or chop, they are usually unsalted and will certainly be made so if requested. *Hashed brown* potatoes also do very well. Probably they may have been cooked in a salted fat, but the amount of salt absorbed would not be very great unless they were deliberately salted.

Mashed potatoes are essentially boiled potatoes and do not taste so well unless salted. Large amounts of salted butter may have been used by the cook in "seasoning" them. The sodium-low case had better beware. Mashed potatoes are the acid test. If the cook can make them palatable without real salt, she is a wizard, and should have little trouble with other things. This is meant to be a challenge. Who wants to try?

Potato soup or purée is essentially boiled potato. This excellent food is hard to make tasty without salt. The substitute usually has an aftertaste which is not very agreeable. Onion added in the making or in the bowl helps a great deal, as will green pepper, celery (but not celery salt or onion salt) and various powdered herbs. Powdered cheese is often used with such soup, but one must be very chary in that regard because all powdered cheeses are rich in sodium. It is true that only a little is needed, but it will be significant if the tolerance for sodium is very low.

Potato salad can be pretty good with salt substitute if the product is seasoned with rather more than the usual amount of onion, vinegar, egg and the like. Various powdered herbs may be used to advantage.

Home-fried potato chips can be made with salt-free butter and preserved in an air-tight can. They cannot compete on equal terms with the commercial varieties, but the latter are very rich in salt and may not be used.

Several potato dishes can be helped in appearance and taste with parsley as a garnish.

FRUITS

Fruits are very rich in vitamins, and minerals; they are attractive and tasty. Fortunately most of them in their native state contain little sodium, and for this reason they should be considered as standbys. As they are processed sodium may be used to some extent, but rarely in such amount as to be highly significant. Dried fruits are sometimes rather high in sodium. Better stick to the fresh or frozen!

NUTS

Practically all nuts are low in native sodium, but when they are fried or salted they are no longer suitable to be used in the present connection. Nuts serve an important rôle as a source of protein.

DESSERTS

When dessert is served, the low-sodium patient will want to be included. Fruits and fruit juices are low in sodium. Commercial "ices" are lower in sodium and calories than ice cream. Some kinds of macaroon, angel food cake and other delicacies in which egg white is used as a leavening agent contain very little sodium. Pie, and cakes and cookies have been discussed elsewhere, pp. 20, 46. *Lemon ice* is a low-calorie and low-sodium substitute for ice cream. We recommend home products made as follows:

Lemon ice.—1 quart water; tablespoonful lemon rind, 1 cup sugar, ¾ cup lemon juice.

Boil water and sugar five minutes, add lemon rind and juice; cool, strain and freeze; ½ cup or a serving will contain less than 2 milligrams of sodium and yet is a very nice treat.

Fondant.—2 cups sugar, 1 cup water, 2 tablespoonfuls light corn syrup, boil and cool. This makes about 1 pound of candy. A serving of 1 ounce gives about 2 milligrams of sodium.

Butterscotch candy can be made using salt-free butter, and may be eaten as desired when there is no caloric restriction.

CONDIMENTS AND INCIDENTALS

Many of these products are high in salt but they are used in small amounts and may be permitted in some instances when the sodium tolerance is pretty high. They may go a long way toward making a diet acceptable and this is well worth while because a diet which is capable of being criticized as being somewhat too high in sodium, is often better than a complete rejectance of all precautions.

MIXTURES OF FOODS

A great many foods of low flavor can be made acceptable by combining with something of high flavor. Potatoes may be greatly improved when cooked with onions as in French fries. A stew with potatoes, onions, carrots and small pieces of beef can be very good. Goulash, Spanish rice, Creole steak, Italian spaghetti (salt free sauce). Foods of different sorts can also be served together, as apple sauce and pork, cranberry sauce and turkey.

GENERAL RECOMMENDATIONS

We strongly recommend that the interested housewife go through her cook book page by page considering what recipes might possibly be used as written, or as modified by the use of a substitute for salt, (salt substitute) soda (potassium bicarbonate) or baking powder (non-sodium baking powder). She will need to give thought as to how she may enhance the flavor, or make the food just as pretty as possible. She will find that more highly flavored foods will do very well indeed; her real challenge will come from those foods which are inclined to be bland and relatively tasteless. A noted French chef once complained that most cooks make a piece of steak taste like a kid glove, but he, the Incomparable Gaston could make a kid glove taste like a tidbit. After getting permission to remove the metal clasps and the threads with which the gloves were sewed he is said actually to have served kid gloves as a gourmet's dinner and they were eaten and enjoyed. Well, it's a good story anyway. There is real challenge to a housewife when her husband—or she herself—is put on a low-sodium diet. Here is an opportunity to show in a very effective way her worth—her skill and ability as a cook—and her love.

11

Food Lists Rated by Content of Natural Sodium

In preparing lists of this sort we are greatly handicapped by difficulties entirely beyond our control. For this reason the following values must be taken as *approximate* instead of being absolute. They are *suggestive* rather than compulsory; they are as close to accuracy as we can get. They are not expected to take the place of directions prepared by the physician or hospital dietitian in the feeding of a serious case which must stick close to a very low-sodium intake, but are intended to orient the housewife who must cook for herself or for a member of her family *after* the case is less acute; they are for treatment in the home when the patient is not under detailed daily directions from an attending physician or dietitician.

There are several tables of analysis available for estimating the amount of sodium aside from that added in cooking or serving in the food of the sodium-low patient. These tables vary rather widely, particularly with regard to certain foods. Five sets of analyses are available as follows:

Peterson, Skinner and Strong, Elements of Food Biochemistry, New York, Prentice-Hall Co., 1943.

Sherman, Chemistry of Food and Nutrition, New York, Macmillan Co., 1946.

McCance and Widdowson, The Chemical Composition of Foods, Chemical Publishing Co., 1947.

Mead Johnson Research Laboratory, 1947, Journal of American Dietic Association, *25*, 304, 1949.

Mattice, Bridges' Food and Beverage Analysis, Philadelphia, Lea & Febiger, 1950.

We have chosen to follow the Mead Johnson figures in this discussion for the reason that they are recent, are made by the flame photometer method which is considered the most accurate, and the

food analyzed is from the central portion of the United States which seems more likely to be representative. It might appear that we should give all of these tables in complete form and any others that might be found, but the combined picture would be made more confusing to the layman for whom this book was written. This presentation is a digest of the Mead Johnson tables.

There is no good purpose in attempts to be accurate to a tenth of a milligram. We have in mind an effort which has been made to instruct the layman in these matters which gives menus which appear to be accurate to 0.1 milligram of sodium (0.0001 gram, or 1/300,000 of an ounce). This is as absurd as giving distances on a road map in feet and inches instead of miles. This authority gives a typical menu for the day as indicated below.

	Milligrams of Sodium
Breakfast	73.4
Lunch	161.3
Dinner	265.9
Total	500.6

Actually it is quite unlikely that the above estimate would be within 200 milligrams of being absolutely correct, nor need it be closer that that. As evidence of these discrepancies we cite a few food which are given extremely wide ranges of sodium content by the analytic tables from different authorities. Sources of information are indicated by letter of the alphabet. We do not wish to identify the sources any closer. The values given below are in milligrams of sodium per *ounce* of food.

	A	*B*	*C*	*D*
Prunes (dry)	22.2	28.8	3.5	1.4
Oysters	134.6		143.0	20.6
Apple	2.8	4.2	0.6	0.02
Flour white	12.8	15.1	0.6	0.28
Cantaloupe	12.2	13.7	3.8	3.4
Potatoes	6.8	8.5	2 0	.17

These variations account for the fact that some authorities recommend oysters as being safer than most shellfish, while others warn specifically against oysters. We hasten to say that most foods are far less controversial, but even those which are most uniform are by no means highly so. We cite the following ex-

amples of important foods for which the authorities are much more nearly in agreement than are most others and yet even they show considerable range: (in milligrams of sodium per *ounce* of food).

	A	*B*	*C*	*D*
Beef, lean	24.0	18.8	19.6	15.0
Bread, white	127.	148.	112.	191.
Celery	37.1	28.8	38.9	31.4
Egg white	48.5	50.0	54.7	57.1
Kidney beef	65.7	68.0	69.5	60.0
Milk, whole	14.5	13.4	14.2	14.5
Pork	19.7	23.1	18.8	16.5

It will be seen that even with most uniform analyses it would be impossible to prepare menus which are more exact than a probable error of 20 or 30 per cent, nor is it necessary to be more accurate. Patients will vary widely in their ability to excrete sodium or in their inclination to hold it. The point is simply this:

The problem is a clinical one rather than a purely dietetic one. The patient must stick close to the recommendations of the physician made after examination or observation of the patient. If the patient is doing well it is safe gradually to become more liberal in the diet. If the patient is doing badly in relation to his clinical symptoms there may be need to change medication, to further restrict activity, or lower sodium intake. The advice and help of the dietician is valuable, but the primary decision lies with the physician in charge.

Just the same we must do something in a manual of this sort to orient the housewife in her evaluation of foods to choose for the low-sodium diet. Much depends upon how much of a given food is used, a liberal helping of a low-sodium food may give as much actual sodium as a sprinkling of a product which contains it in large amount. Common sense must be the guide to the selection of food for a particular person on a low-sodium diet. His individualized nutritional needs, his tastes, his pocketbook his ability to gain competent cooperation in the kitchen and even other factors must be taken into consideration.

Many difficulties attend the making of recommendations for a given person. We shall enumerate some of them to the end that the housewife may understand why we must hedge the subject about with many reservations.

1. The terms used in sodium content tables are mostly unfamiliar to the housewife. Sodium is usually expressed as so many milligrams per 100 grams of the food in question. A gram of weight is about 1/30 of an ounce. A milligram is 1/1000 of a gram, or 1/30,000 of an ounce. One hundred grams of food is something over 3 ounces or about 1/5 of a pound. If a housewife should wish to check a diet closely she will need to weigh the food and make use of a table containing numerical values. It is quite a task. It will help if she will learn the metric table and use scales calibrated in grams rather than ounces. She can, however, do very well with the tables *hereinafter printed without using scales and tables.* If the needs of the case are so strict as to need weighing of all food, the housewife should have individual directions from the dietitician or physician.
2. Analyses for natural sodium content vary widely for several reasons. Older methods often gave rather too high values because the food had to be burned and the ash analyzed. By this method some of the potassium in the food was usually estimated as sodium. Newer methods make use of a more accurate instrument, the flame photometer, but it too can give erroneous results in the hands of inexpert technicians.

   Food from a given community may differ from that of a distant region depending upon the sodium content of the soil. Different varieties of the same food may show considerable variation. The figure given in the table will be more accurate if an average of several samples is taken, but this has not always been done.
3. The processing of food by different manufacturers varies widely indeed. Sodium salts are cheap and have a good flavor. They are for that reason used a great deal, and are *harmless for the healthy consumer.* For that reason they may not be declared on the label—much to the inconvenience of the sodium-low patient and his cook.

For purposes of convenience, and also so that we may consider groups of food rather than individual foods alone, we have seen fit to classify them by composition as well as by sodium content. If the housewife will give these tables close study, she will soon be able to orient herself in their practical usage.

FRUITS

(Figures at head of column indicate milligrams of sodium per 100 grams of the food.)

Very Low under 1 mgm.	*Low 1–5 mgm.*	*Medium 5–25 mgm.*	*High 25–200 mgm.*	*Very High over 200 mgm.*
Apples				
(peeled)				
Applesauce	Apricot canned			
Apricot	in syrup			
	Banana			
Blackberry	Cider (Apple)			
Blueberry	Cranberry	Cantaloupe		
	Cranberry sauce			
	Currant			
Dates (semi				
dry)				
Gooseberry		Fruit cocktails	Figs (dried)	
Grape juice	Grapes	(canned)		
Grapefruit		Grape jam		
(juice)				
Lemon				
Mulberry				
Orange				
Orange juice				
Peach		Peach		
	Pear	(canned)		
Pineapple	Pineapple	Pear		
Pineapple	(canned)	(canned)		
juice				
Plum				
	Prunes (canned)	Plum		
Pomegranate	Prune (juice)	(canned)		
Quince		Prunes (dry)		
Raspberry		Raisins		
Strawberry	Tangerine			
Watermelon	Tomato			
	(canned)			
	Tomato juice		Tomato	
			(catsup)	

Summary.—It will be noted that fruits in their natural state are quite *low in sodium.* They are also *low in caloric value; high in flavor, attractiveness, vitamins and mineral content.* Fruits should be much used in the low-sodium diet.

Caution.—Certain fruits may have been processed with a sodium containing chemical—notably canned peaches for removing the skin, and apples for removing the poisonous spray residue which may be left on the skin. Certain of the dried fruits are evaporated apples, and white raisins may have been bleached by the use of sodium sulphite.

Recommendations.—Cases on a *very strict* low-sodium diet should therefore use fruits only in their native state, or frozen without other processing. If they should note a sudden increase in weight after eating a particular brand of food, suspicion should be aroused.

VEGETABLES

(Figures at head of columns indicate milligrams of sodium per 100 grams of food.)

Very Low under 1 mgm.	*Low 1–5 mgm.*	*Medium 5–25 mgm.*	*High 25–200 mgm.*	*Very High over 200 mgm.*
	Asparagus			
	Beans (green)	Beans (dry)		Asparagus (canned)
		Broccoli	Beets	Beans (canned)
Cucumbers (pared)	Cabbage	Brussels Sprouts		
		Cauliflower	Carrots	Carrots (canned)
			Chard	
			Celery	Citron (candied)
			Dandelion	
Egg plant		Endive		
		Garlic	Horseradish	
		Lettuce	Kale	
	Mushroom		Kohlrabi	Mushroom (canned)
			Mustard greens	
			Parsley	Potato chips
Okra pods		Parsnips		Potato (canned)
Onion	Potato	Radish		Sweet potato (canned)
Peppers (green)	Pumpkin	Sweet potato		
Rhubarb (stalk)				Spinach (canned)
				Tomato juice
Squash	Tomato	Tomato (canned)		Tobacco (chewing)
Salsify	Rutabaga	Turnip greens	Turnip	

Summary.—*It will be noted that the vegetables tend to be in the intermediate group when they are in their native state.*

Caution.—Most *canned* vegetables have salt added. Frozen vegetables have less added salt and many brands have no added salt. It would be well to read the labels closely or to write to the producers of the brands which are conveniently bought and make inquiry on this point. *Note* that greens and roots are rather high.

CEREALS AND LEGUMES

(Figures at head of columns indicate milligrams of sodium per 100 grams of food.)

Very low under 1 mgm	*Low 1–5 mgm.*	*Medium 5–25 mgm.*	*High 25–200 mgm*	*Very High over 200 mgm.*
Beans (green and mostly pod)	Barley (pearled)	Beans (dry)		Beans (canned)
	Beans (Lima, green)			Beans (canned Lima)
	Bread (low-sodium)			
	Bread (Passover matzoth)			Bread
				Cakes
Corn meal	Cereal			Cookies
	Ralston	Corn		Corn Flakes
	Wheatena			Crackers (soda)
	Cream of Wheat		Hominy	Crackers (graham)
	Corn Starch	Corn (frozen)		
	Cow pea			Dry breakfast cereals
	Flour			
	Macaroni			Farina (quick cooking)
	Oats (rolled)			
	Rice			Peas (canned)
	Spaghetti	Pop-corn (oiled, but not salted)	Hominy	Popcorn (buttered and salted)
	Wheat (shredded)			
	Wheat (puffed)		Peas (frozen)	Pretzels
			Postum	Rice flakes
				Wheat flakes
				Zwieback

Summary.—Cereals and legumes are usually rather low in sodium until they have been processed in some way, and then depending upon what the method of processing may have been they are likely to be high. The frozen corn, beans and peas are usually unsalted but one should attempt to make sure on that point concerning the brand used.

VEGETABLES

(Figures at head of columns indicate milligrams of sodium per 100 grams of food.)

Very Low under 1 mgm.	*Low 1–5 mgm.*	*Medium 5–25 mgm.*	*High 25–200 mgm.*	*Very High over 200 mgm.*
	Asparagus			
	Beans (green)	Beans (dry)		Asparagus (canned)
		Broccoli	Beets	Beans (canned)
Cucumbers (pared)	Cabbage	Brussels Sprouts		
		Cauliflower	Carrots	Carrots (canned)
			Chard	
			Celery	Citron (candied)
			Dandelion	
Egg plant		Endive		
		Garlic	Horseradish	
		Lettuce	Kale	
	Mushroom		Kohlrabi	Mushroom (canned)
			Mustard greens	
			Parsley	Potato chips
Okra pods		Parsnips		Potato (canned)
Onion	Potato	Radish		Sweet potato (canned)
Peppers (green)	Pumpkin	Sweet potato		
Rhubarb (stalk)				Spinach (canned)
				Tomato juice
Squash	Tomato	Tomato (canned)		Tobacco (chewing)
Salsify	Rutabaga	Turnip greens	Turnip	

Summary.—It will be noted that the vegetables tend to be in the intermediate group when they are in their native state.

Caution.—Most *canned* vegetables have salt added. Frozen vegetables have less added salt and many brands have no added salt. It would be well to read the labels closely or to write to the producers of the brands which are conveniently bought and make inquiry on this point. *Note* that greens and roots are rather high.

NUTS

(Figures at head of columns indicate milligrams of sodium per 100 grams of food.)

Very Low under 1 mgm.	*Low 1–5 mgm.*	*Medium 5–25 mgm.*	*High 25–200 mgm.*	*Very High over 200 mgm.*
Brazil	Almond		Almond (roasted)	Salted nuts of all kinds
	Chestnut	Cashew	Brazil (roasted)	
		Cocoa Nut	Cashew (roasted)	
Filbert				
Peanut in shell				
Peanut Oil	Walnut (black)			
Pecan	Walnut (English)		Peanut butter	

Summary.—Nuts are low in sodium unless they have been processed in some way. In such case, they are practically all very high in sodium content. Most nuts may often be bought in the shelled form and yet still unsalted. It is up to the patient to be his own chaperon in this regard. Nuts make a pleasant tidbit to be served casually to the low-sodium case *if they are unsalted*. The careful hostess may take this into consideration if her guests are known to be on a low-sodium diet. It should be borne in mind that all nuts are fattening as they have quite high caloric value.

ANIMAL PRODUCTS

Meats, Fish, Eggs, Milk and Milk Products. (The figures at the heads of the columns indicate milligrams of sodium per 100 grams of food.)

Very low under 1 mgm.	*Low 1–5 mgm.*	*Medium 5–25 mgm.*	*High 25–200 mgm.*	*Very High over 200 mgm.*
			Beef (lean)	All salt cured meats and fish
			Brain	
		Butter (unsalted)	Milk	Bacon
				Beef (dried)
				Beef (corned)
				Anchovy paste
				Bouillon cubes
			Catfish	Butter
			Chicken	
			Chocolate milk	Caviar
			Clam	Cheese
			Cod (fresh)	Cod (frozen fillets)
				Cod (flakes)
			Duck	Crab
			Egg	
			Halibut	Ham
			Heart Meat	
Lard	Lonalac (milk substitute, reliquified Lonalac (dry)		Ice cream	
			Lamb	
			Liver	
			Milk	Lobster
			Oyster	Oleomargarine
			Pork	
	Shortening (Crisco)		Quail	Pork (salt)
Shortening (Spry)			Rabbit	
			Salmon (Fresh)	Salmon (canned)
				Sardine
				Sausage (pork)
			Sausage (Bologna)	*Sausage* (frankfurt)
				Soup (canned)
			Shrimp	
			Soup (*canned*, vegetable)	
			Sweet Bread	
			Tongue	Tuna
			Turkey	Worcester and *other meat* sauces
			Veal	

Summary.—Practically all animal products are high in sodium content, but may be taken in some measure by the low-sodium patient who has a rather liberal allowance.

Caution.—The products which are *underscored* are exceedingly high in sodium content and may not be taken at all. *ALL salted* products are definitely out. Small portions of fresh meats are permitted for the sake of the valuable animal proteins they contain, but they add sodium quite rapidly even so. It is this group of foods which must be watched the closest, and it is in this group that there is the most likelihood of abuse. It is too bad, but there doesn't seem to be too much that can be done about it. Shellfish of all sorts must be used most sparingly if at all.

The use of the lists which have been given in the preceding pages will call for a bit of ingenuity on the part of the one who prepares the meals and will require cooperation on the part of the person who eats the food. Let us suppose that we classify sodium-low patients depending upon the amount of sodium they may be allowed, and see how these tables can be used by the housewife in preparing a diet which will be just as attractive as possible and still keep within the limitations prescribed. We shall want it understood that we are striving for an *effective* diet that can be used for months and years without it becoming such an insufferable burden to the patient or his cook that it will be discarded. We are trying for *clinical results* rather than mathematical accuracy as the diet is written down in the record.

1. *Very Strict Low-Sodium Diet;* (Under 500 milligrams of sodium per day).

   Patients of this degree of urgency will usually be in the hospital and will be confined to bed under the immediate and daily supervision of a physician and dietitian. In such case, the food is prepared elsewhere than in the home of the patient. The exact amounts of food and the composition of the same is controlled by the staff, the personnel of which are trained in such matters. We are not attempting to direct them in this work, as they are presumably well qualified to handle it.

   If, however, such a patient simply cannot be in a hospital and it is absolutely necessary that the food be prepared in the family kitchen it can be done, though we do not recommend the attempt if other arrangements can be found. The housewife in this case must stick close to the left side of the lists given above and may not experiment. The amount of sodium can also be limited by the total amount of food. In any such case the family must stick close to the directions of the physician in charge, who will, of course, constantly be checking on the clinical condition and the weight of the patient.

2. *Strict Low-Sodium Diet;* (500–1000 milligrams of sodium per day).

SEASONING AGENTS

(Figures at head of columns indicate milligrams of sodium per 100 grams of food.)

Very Low under 1 mgm.	*Low 1–5 mgm.*	*Medium 5–25 mgm.*	*High 25–200 mgm.*	*Very High over 200 mgm.*
Coca-Cola	Brandy			
Dextrose		Caraway seed	Allspice	Anchovy paste
				Bouillon cubes
				Catsup (tomato)
		Cinnamon	Celery seed	Celery salt
			Chocolate	Baking soda
			Curry powder	Baking powder
Gin		Garlic		
		Ginger Ale	Ginger	
		Honey	Gravy flavoring	
		Maple Syrup	Horse Radish	
	Mustard powder	Nutmeg		
Salt substitute		Parsley		
Sugar	Orange crush (soft drink)	Pepper (black)	Pepper (red)	
		Sorghum	Sage	Onion salt
	Rum	Sugar (brown)	Syrup (corn and cane)	Salt
Vanilla extract	Tea		Thyme	
Vinegar (cider)				
Whiskey,				
Wine (port)				Worcestershire sauce and similar products

Summary.—Most of these products are served in very small amounts and may be used very sparingly to dress up a diet which otherwise would be very unattractive. Some of them can be prepared in the home so that they are safe, as for example salt-free tomato catsup, horse-radish, mustard, *etc.*

Caution.—The products which are *underscored* are exceedingly high in sodium content and may not be taken at all.

The use of the lists which have been given in the preceding pages will call for a bit of ingenuity on the part of the one who prepares the meals and will require cooperation on the part of the person who eats the food. Let us suppose that we classify sodium-low patients depending upon the amount of sodium they may be allowed, and see how these tables can be used by the housewife in preparing a diet which will be just as attractive as possible and still keep within the limitations prescribed. We shall want it understood that we are striving for an *effective* diet that can be used for months and years without it becoming such an insufferable burden to the patient or his cook that it will be discarded. We are trying for *clinical results* rather than mathematical accuracy as the diet is written down in the record.

1. *Very Strict Low-Sodium Diet;* (Under 500 milligrams of sodium per day).

   Patients of this degree of urgency will usually be in the hospital and will be confined to bed under the immediate and daily supervision of a physician and dietitician. In such case, the food is prepared elsewhere than in the home of the patient. The exact amounts of food and the composition of the same is controlled by the staff, the personnel of which are trained in such matters. We are not attempting to direct them in this work, as they are presumably well qualified to handle it.

   If, however, such a patient simply cannot be in a hospital and it is absolutely necessary that the food be prepared in the family kitchen it can be done, though we do not recommend the attempt if other arrangements can be found. The housewife in this case must stick close to the left side of the lists given above and may not experiment. The amount of sodium can also be limited by the total amount of food. In any such case the family must stick close to the directions of the physician in charge, who will, of course, constantly be checking on the clinical condition and the weight of the patient.

2. *Strict Low-Sodium Diet;* (500–1000 milligrams of sodium per day).

Patients of this group are often in the hospital and in such case, we make no recommendations. The physician should see the case frequently and will direct the treatment. Many such patients, however, can be at home, and in this case, the housewife will be preparing his food. She will stick close to the left side of the tables given, though she may need to get a little animal protein which is usually rather high in sodium—meat, egg, milk. A daily record of weight should be made making sure that the conditions as time of day, clothing and the like are uniform.

3. *Moderately Low-Sodium Diet;* (1000–1500 milligrams of sodium).

Patients of this group will commonly be at home and may need to continue on such a diet for long periods of time. They will often be feeling quite well and may get very hungry. They will be needing more protein than they got when they were on a more strict diet and so the animal products which tend to be high will be introduced cautiously. In other regards the housewife had better still stick close to the left side of the lists. She should not use any of the foods in the extreme right hand column unless they are of the nature of flavoring or seasoning and in such case are to be used only in *very* small amounts. The clinical condition and the weight are watched closely. If the weight is satisfactory the amount of food in the fourth column can be increased cautiously for the sake of the animal proteins. It is usually not desired that the patient gain much in weight, unless he is quite thin.

4. *Liberal Low-Sodium Diet;* (1500–2000 milligrams of sodium per day).

Somewhat less care is needed in the preparation of the food to the end that the patient not be made to feel too restricted. This must be a diet that can be maintained for years—very likely for the remainder of life. There is enough latitude here that individual preferences can be considered. Possibly regular bread in small amount can be allowed instead of the salt-free. Those forms of meat which are somewhat higher in sodium—fish, veal, lamb—may be used for a bit of variety. Any

undesired gain in weight should at once call for a reduction in sodium if it is sudden, or a reduction of calories if it is gradual. The physician should see the individual frequently; he will check on weight, blood pressure, and the like. Occupation will need to be supervised in all probability, though in this place we are attempting only to discuss the diet.

5. ***Very Liberal Low-Sodium Diet;*** (2000–2500 milligrams of sodium per day).

Persons in this group will usually be up and about, doing such work as will be permitted by the physician or as may be necessary to make a living. They must be subject to check by the physician, of course, else they could easily slip back. The diet is quite easy at this level if the cook will avoid column five in the lists given and will use no salt as such at the table or as the food is being prepared. These patients will naturally crave the foods which have been so tasty in times past, but they had best forego them entirely or take them in very small amounts and be willing to do penance afterwards. The problem of providing a suitable diet is much easier, but in many regards it is more difficult to avoid abuse. It will be well if the housewife preparing the individual's food still watches to avoid the foods in the right side of the table, except as it may be necessary to increase the animal products.

Again we wish to warn the reader that the "proof of the pudding is in the eating thereof." These tables are purposely made general rather than specific because the author is well aware that the housewife (or for that matter the dietitician) cannot expect to be absolutely accurate in the preparation of a low-sodium diet. Fortunately it is not necessary to split hairs, or milligrams, in arranging a safe diet along these lines. We are eager that she give her thoughts to making the food safe within the range set by the physician; that she give a lot of thought to making it as attractive, as tasty, as suitable for its purpose as possible, and that she not find it such a burden that she cannot keep it up as long as will be needed. We do not want her wasting her precious time worrying about fractions of a milligram of sodium. We are very eager to have food which the patient can and will accept indefinitely, and which the physician can approve as he watches the clinical condition.

Patients of this group are often in the hospital and in such case, we make no recommendations. The physician should see the case frequently and will direct the treatment. Many such patients, however, can be at home, and in this case, the housewife will be preparing his food. She will stick close to the left side of the tables given, though she may need to get a little animal protein which is usually rather high in sodium—meat, egg, milk. A daily record of weight should be made making sure that the conditions as time of day, clothing and the like are uniform.

3. *Moderately Low-Sodium Diet;* (1000–1500 milligrams of sodium).

Patients of this group will commonly be at home and may need to continue on such a diet for long periods of time. They will often be feeling quite well and may get very hungry. They will be needing more protein than they got when they were on a more strict diet and so the animal products which tend to be high will be introduced cautiously. In other regards the housewife had better still stick close to the left side of the lists. She should not use any of the foods in the extreme right hand column unless they are of the nature of flavoring or seasoning and in such case are to be used only in *very* small amounts. The clinical condition and the weight are watched closely. If the weight is satisfactory the amount of food in the fourth column can be increased cautiously for the sake of the animal proteins. It is usually not desired that the patient gain much in weight, unless he is quite thin.

4. *Liberal Low-Sodium Diet;* (1500–2000 milligrams of sodium per day).

Somewhat less care is needed in the preparation of the food to the end that the patient not be made to feel too restricted. This must be a diet that can be maintained for years—very likely for the remainder of life. There is enough latitude here that individual preferences can be considered. Possibly regular bread in small amount can be allowed instead of the salt-free. Those forms of meat which are somewhat higher in sodium—fish, veal, lamb—may be used for a bit of variety. Any

TYPICAL FOOD CHART FOR DIFFERENT LEVELS OF SODIUM TOLERANCE

Comparison of Low-Sodium Diets

Foods Included Daily (Total for one day)	*200 mg.*	*400 mg.*	*700 mg.*	*1000 mg.*
1. Bread (yeast unsalted), or Matzoth (Passover)	3 slices	3½ slices	5½ slices	6 slices
2. Cereal, unsalted cooked, or ½ Shredded Wheat Biscuit,	as sub.*	½ cup	½ cup	½ cup
or Puffed Wheat, or Puffed Rice	as sub.*	1 cup	1 cup	1 cup
3. Cream	none	¼ cup	¼ cup	½ cup
4. Egg	4 × wk.	4 × wk.	1 daily	1 daily
5. Milk, whole	none	none	2 cups	3 cups
6. Unsalted lean meat or fish (fresh, unsalted)	4 oz.**	5 oz.**	6 oz.**	6 oz.**
7. Unsalted vegetables (*see* list)	1 cup	1½ cup	1½ cup	2½ cup
8. Unsalted potato (in addition to the above vegetables)	½ cup	½ cup	½ cup	½ cup
9. Unsalted cooked rice (in addition to vegetables and potatoes)	½ cup	as sub.***	as sub.***	as sub.**
10. Fruits (*see* list)	1½ cup	1½ cup	1½ cup	1½ cup
11. Unsalted fat (Spry, Crisco)	6 tbsp.	3+ tbsp.	3+ tbsp.	3+ tbsp.
12. Sugar and jelly (no preservative)	6 tbsp.	6 tbsp.	6 tbsp.	6 tbsp.
Approximate Food Composition				
1. Carbohydrates in gms.	250	250	300	350
2. Protein in gms.	56	70	95	105
3. Fat in gms.	92	80	110	120
4. Calories	1800–2000	2000–2200	2500+	2800–3000
5. Below Required Allowances	Calcium-Vit. A	Calcium-Vit. A	None	None

* Cereal may be substituted for 1 slice of unsalted bread.
** 4 oz. (2 pieces 2½" × ½"); 5 oz. (1 piece 3½" × 3½" × ½")—(1 piece 2½" × 2½" × ½"); 6 oz. (2 pieces 3½" × 3½" × ½")
*** Substitute rice in place of potatoes, or vegetables.

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Typical Food Charts for Study and Consideration

THE following charts have been furnished by the Dietetics Department of Indiana University School of Medicine, and are used with their permission. It will be noted that they are arranged in different ways. Different persons may like the one method better than another. The author sincerely hopes that the housewife who must prepare low-sodium menus will find something here that she can use. He also wishes it understood that these charts are not intended to replace *any* others which might have been furnished by the physician in charge. These are merely *suggestions; they are not orders unless the physician in charge should* make them so.

It should be borne in mind that patients on really low tolerance of sodium per day should either be in a hospital or under strict supervision in matters pertaining to diet. It is difficult—but not impossible—for the housewife untrained in exact dietetic methods to take care of the really strict low-sodium diets.

TYPICAL FOOD CHART FOR ONE DAY
LOW-SODIUM DIET (Approximately 400 mgm.)

Foods to include every day.

All food is prepared without salt, soda, or baking powder. Only the *amounts* of food listed should be used. Salt substitute may be used.

TYPE DIET

Breakfast

1. Grapefruit Juice—½ cup or ½ grapefruit
2. Unsalted cooked cereal—½ cup *or* ½ Shredded Wheat Biscuit *or* Puffed Wheat or Puffed Rice—1 cup
3. Cream—½ cup
4. Egg—Every other morning
5. Unsalted Bread—1 slice *or* Matzoth (Passover or Thin Tea)
6. Unsalted Fat—at least 1 tablespoon
7. Sugar and Jelly (no added preservative)—at least 2 tablespoons
8. Black Coffee or Tea

Noon or Evening Meal

1. Unsalted Lean Meat—1 piece (3½" × 3½") or 1 egg
2. Unsalted Potatoes—½ cup
3. Unsalted Vegetables (*see* list)—½ cup
4. Unsalted Bread—1 slice
5. Unsalted Fat at least 2 tablespoons
6. Fruit (*see* list)—½ cup
7. Sugar and Jelly—at least 1 tablespoon
8. Coffee, tea, lemonade, or Koolade

Evening or Noon Meal

1. Unsalted Lean Meat—1 piece about 2½" × ½" × ½"
2. Unsalted Vegetables (*see* list)—½ cup
3. Lettuce or Raw Green Vegetables (*see* list)—½ cup
4. Unsalted Bread—1½ slices.
5. Unsalted Fat at least 2 tablespoons
6. Fruits (*see* list)—½ cup
7. Sugar and Jelly at least 1 tablespoon
8. Coffee, Tea, lemonade, or Koolade

FRUIT LIST

Apples	Figs, fresh	Grapes	Persimmon	Peaches	Rhubarb (½c)
Blackberries	Gooseberries	Lemon	Pineapple	Pear	Strawberries
Cherries	Grapefruit (½)	Loganberries	Plum	Prunes	Tangerines
Cranberries	Grapefruit Jc.	Mulberries	Orange	Raspberries	Watermelon

UNSALTED VEGETABLE LIST (FRESH, FROZEN, CANNED WITHOUT SALT)

				Use ½ cup	
Asparagus	Eggplant	Parsnips	Tomatoes		
Broccoli, buds	Green Beans	Peas, fr.	Tomato Jc.	Cabbage	Corn
Brussel Sprouts	Mushroom, fr.	Salsify	Potatoes	Lettuce	Cauliflower
Cucumber	Onions	Squash		Carrots	Endive

FOODS TO AVOID

1. Salted bread, butter, margarine, and crackers.
2. Regular canned vegetables, packaged foods, and canned soups.
3. Cakes, cookies, pies, quick breads.
4. Salted cheeses; canned, smoked, or salted meat and fish. Bacon, ham, sausage, corned beef, chipped beef, herring, sardines, salmon, and tuna.
5. Meat sauces and meat extracts. Catsup, prepared mustard, salad dressings, celery and onion salts, olives, and pickles. Meat broths.
6. Fruit and Vegetables not on list.

TYPICAL FOOD CHART FOR ONE DAY
LOW-SODIUM DIET (Approximately 200 mg.)

All food is prepared and cooked without salt, soda, and baking powder. Canned vegetables should be packed without salt. Salt substitute may be used.

Type Diet

Breakfast

1. Grapefruit Juice ½ cup or grapefruit half
2. Egg. Include about 4 a week
3. Unsalted bread—1 slice *or* unsalted *cooked cereal or* ½ Shredded Wheat Biscuit *or* 1 cup Puffed Wheat or Puffed Rice
4. Unsalted butter or Margarine—2 tablespoons of more
5. Sugar and Jelly (no preservative)—at least 2 tablespoons
6. Coffee or Tea

Noon or Evening Meal

1. Unsalted lean cooked meat—about 2 ounces. 1 piece 2½" × 2½" × ½"
2. Unsalted Vegetable (*see* list)—½ cup—Sodium 20 mgm.
3. Unsalted Potatoes—½ cup—Sodium 24 mgm.
4. *Unsalted Bread*—1 slice
5. Unsalted Butter or Margarine—at least 2 tablespoons
6. Fruits (*see* list)—½ cup— Sodium 10 mgm.
7. *Sugar and Jellies (no preservative)* at least 2 tablespoons
8. Coffee, Tea, or Koolade if desired

Evening or Noon Meal

1. Unsalted lean cooked meat or fish—about 2 ounces. 1 piece 2½" × 2½" × ½"
2. *Unsalted Vegetables (see list)*—½ cup—Sodium 20 mgm.
3. Unsalted Cooked Rice (*see* list)—½ cup
4. Unsalted Bread—1 slice
5. Unsalted Butter or Margarine or unsalted fat—at least 2 tablespoons
6. Fruits (*see* list)—½ cup—Sodium 10 mgm.
7. Sugar and Jellies *(no preservative) at least 2 tablespoons*
8. Coffee, tea, or Koolade.

Vegetable List

Group I (1 cup)	*Group II (½ cup)*	*Group III (½ cup)*	*Group IV (½ cup)*	*Omit*	
Parsnips	Asparagus	Green Beans	Cabbage	Beans	Kohlrabi
Squash	Cucumber	Broccoli, buds	Lettuce	Beets	Pumpkin
	Eggplant	Peas, fresh	Cauliflower	Carrots	Spinach
	Onions	Tomatoes	Sweet Corn	Chard	Turnips
	Tomato Jc	Potatoes	Turnip Greens	Dandelion *greens*	Peas, dried
		Sweet Potatoes		Kale	Watercress
					Radishes

Fruit List

Group I (1 cup)	*Group II (½ cup)*	*Group III (½ cup)*	*Group IV (½ cup)*	*Omit*
Blackberries	Apple	Blueberries	Currants, dried	Avocado
Cherries	Currants, fr.	Huckleberries	Currants	Banana
Cranberries	*Figs, fresh*	*Lemons*	Watermelon	Cantaloupe
Grapefruit	Gooseberries	Peaches	Rhubarb	Coconut
Grapefruit Jc.	Grapes	*Pineapples*		*Dates*
Loganberries	Oranges			Figs, dried
Plums	Pear			Raisins
	Persimmon			
	Strawberries			

(Allowance should be made for the sodium content of the water if known.)

TYPICAL FOOD CHART FOR ONE DAY
LOW-SODIUM DIETS (700 mgm. Sodium)

All food is prepared without salt, soda, or baking powder. Canned vegetables should be packed without added salt. Salt substitute may be used.

Type Diet

Breakfast

1. Orange or grapefruit—½ cup
2. Salt-free cooked cereal—½ cup *or* salt-free prepared cereal—1 cup
3. Egg—1
4. Salt-free bread—1½ slices
5. Salt-free butter—1 tablespoon
6. Cream—¼ cup
7. Sugar and Jelly—2 tablespoons
8. Coffee and tea as desired

Noon Meal

1. Salt-free lean cooked meat—1 slice (3½" × 3½" × ¼")
2. Salt-free potatoes—½ cup
3. Salt-free vegetables—*see* list—½ cup
4. Salt-free butter—1 tablespoon plus 1 teaspoon
5. Salt-free bread—2 slices
6. Fruit—*see* list—½ cup
7. Milk, whole—1 cup
8. Sugar and Jelly—2 tablespoons
9. Coffee, tea, or Koolade as desired

Evening Meal

1. Salt-free lean cooked meat—1 slice (3½" × 3½" × ¼") *or* egg—one.
2. Salt-free cooked vegetable—½ cup
3. Lettuce—¼ cup
4. Salt-free bread—2 slices
5. Salt-free butter—1 tablespoon plus 1 teaspoon
6. Fruit—*see* list—½ cup
7. Milk—1 cup
8. Sugar and Jelly—2 tablespoons
9. Coffee, tea, or Koolade as desired

Caloric Value—2500–2700 calories

Lemonade and Koolade between meals is helpful in keeping the calories up.

Foods to Avoid

Bouillon cubes, catsup, canned salted vegetables, olives, pickles, salted butter salted nuts, celery salt, onion salt, and sauerkraut, canned, salted or smoked meat or fish; bacon, ham, sausage, corned beef, chipped beef, herring, sardines, salmon, and tuna.

ALTERNATE FOOD CHART FOR ONE DAY
DAILY LOW-SODIUM DIET (400 mgm. Sodium)

Food Groups	*Foods Allowed*			*Quantity*
Beverages	Clear Coffee Kool Aid Clear Tea			As desired
Bread	Yeast bread made without salt			3 slices
Cereals	Any cooked, unsalted cereal; macaroni or spaghetti may be substituted for 1 slice bread or 1 Shredded Wheat Biscuit, or ½ cup Puffed Wheat			½ cup
Fat	Any unsalted fat			As desired
Fruits	Apples Apricots Bananas Blackberries Cherries Cranberries Gooseberries	Grapefruit (½) Grapes Lemons Mulberries Oranges Peaches Pears Pineapple	Plums Prunes (fr. or stewed) Raspberries Rhubarb Strawberries Tangerines	3–4 ½ cup of any 3
Cooked meats and fish	Beef Chicken Lamb Mutton	Pork Rabbit Veal Venison	*Fish (fr., unsalted)* Bass Cod Halibut Trout	*5 ounces of one*
Egg	Poached, Baked, Scrambled, Fried in Spry or Crisco or salt-free butter.			one
Nuts, unsalted	Peanuts Almonds	English Walnuts Pecans		50–55 nuts
Potatoes or substitutes	Macaroni (cooked) Potato, white Sweet Potato	Rice (cooked) Spaghetti (cooked)		½ cup of any one
Seasoning	Vinegar Paprika Pepper	Garlic Onion Lemon juice		Small amounts
Soups	None			
Sweets	Jelly	Granulated sugar		3 tablespoons as desired
Vegetables	Asparagus Broccoli Brussels Sprouts Cabbage Carrot (½ cup only) Cauliflower Cucumber	Eggplant Endive Green Beans Lettuce Mushrooms Onions Parsnips	Peas Salsify Squash Tomatoes	½ cup of any three

NOTE.—All food is prepared without salt, soda, or baking powder. Only the exact amount of foods listed should be allowed. Salt substitutes may be used.

TYPICAL FOOD CHART FOR ONE DAY
LOW-SODIUM DIET (1000 mgm. Sodium)

TYPE DIET

Breakfast

1. Orange or grapefruit—½ cup
2. Salt-free cooked cereal—½ cup
   or salt-free prepared cereal—1 cup
3. Egg—1
4. Salt-free bread—2 slices
5. Salt-free butter—2 teaspoons
6. Cream—½ cup
7. Milk—1 cup
8. Sugar and Jelly as desired
9. Coffee or tea as desired

Noon Meal

1. Salt-free lean cooked meat—1 slice (3½" × 3½" × ½")
   or egg—1
2. Salt-free potatoes—½ cup
3. Salt-free vegetables—1 cup
4. Salt-free bread—2 slices
5. Salt-free butter—1 tbsp. plus 1 tsp.
6. Fruit—½ cup
7. Milk—1 cup
8. Sugar and Jelly as desired

Evening Meal

1. Salt-free lean cooked meat—1 slice (3½" × 3½" × ½")
   or egg—1
2. Salt-free vegetables—1 cup
3. Lettuce—½ cup
4. Salt-free butter—2 slices
5. Salt-free butter—1 tbsp. plus 1 tsp.
6. Fruit—½ cup
7. Milk—1 cup
8. Sugar and Jelly as desired
   Caloric Value—3000-3200 calories

FOODS TO AVOID

Bouillon cubes, catsup, canned salted vegetables, olives, pickles, salted butter, salted nuts, celery salt, onion salt, and sauerkraut.

Canned, salted or smoked meat or fish: Bacon, ham, sausage, corned beef, chipped beef, herring, sardines, salmon, and tuna. Salt substitutes may be used.

ALTERNATE FOOD CHART FOR ONE DAY
LOW-SODIUM DIET (Approximately 700 mg.)

Foods to include daily.
All food is prepared without salt, soda, and baking powder. Only the *amounts* of foods listed should be used. Salt substitute may be used.

1. Bread, yeast bread prepared without salt—5½ slices—*or*
   Matzoth (Passover for Thin Tea)—*or*
   One serving of cereal as follows.

2. Cereals, unsalted cooked—½ cup—*or*
   ½ Shredded Wheat biscuit—1 cup—*or*
   Puffed Wheat or Puffed Rice

3. Cream—½ cup

4. Egg—*one*

5. Milk, whole—2 cups

6. Lean unsalted meat and fish. Two-3 oz. servings (each piece 3½" × 3½" × ½")

			Fish, fresh and unsalted	
Beef	Veal	Venison		
Lamb	Chicken	Rabbit	Bass	Cod
Pork	Mutton		Halibut	Trout

7. Unsalted Vegetables 3 servings daily of ½ cup per serving.

			Use ¼ cup	
Asparagus	Mushrooms, fresh	Tomatoes		
Broccoli, buds	Onions	Tomato Juice	Cabbage	Corn
Brussel Sprouts	Parsnips	Potatoes	Carrots	Endive
Cucumber	Peas, fresh		Cauliflower	Lettuce
Eggplant	Salsify			
Green Beans	Squash			

8. Unsalted Potatoes.
   Or substitutes: 1 cup cooked unsalted macaroni, spaghetti, noodles, or ½ cup sweet potatoes *or* 2 slices unsalted bread *or* ck. unsalted rice as desired.

9. Fruits—3 servings daily of ½ cup per serving.

Apples	Grapefruit (½)	Pineapple	Peaches	Tangerines
Blackberries	Grapes	Orange	Pear	
Cherries	Lemon	Plum	Persimmon	*Use ¼ cup*
Cranberries	Loganberries	Figs, fresh	Raspberries	Rhubarb
Gooseberries	Mulberries	Prunes, ck.	Strawberries	Watermelon

10. Unsalted fat. Unsalted butter and margarine. 3 tablespoons or more. Crisco and Spry and lard.

11. Granulated white sugar or jellies (no preservative). 6 tablespoons or more.

12. Seasonings as desired.

Allspice	Cinnamon	Garlic	Onion	Extracts of almond
Anise	Clover	Mace	Paprika	" " lemon
Bay	Dill	Nutmeg	Pepper	" " vanilla
Caraway	Dried Mustard		Vinegar	

13. Beverages such as black coffee, tea, lemonade, and *Koolade* may be used unless otherwise stated by the physician.

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Water Supplies in Relation to Sodium Content

THERE is no objection to the use of soft water, as such. As a matter of fact the use of distilled water, which is as soft as water can be, is indicated when the public water supply contains more than 3 milligrams of sodium per 100 grams of water. When water is very hard, however, and has been softened by any of the methods which depend upon the use of common salt in the water softener, there will be found in the softened water a large or small amount of sodium according to whether the water is very hard, or slightly hard before being processed.

In most houses which are supplied with softened water, the processed water is found only in those pipes going to faucets where it will be used for some washing purpose. It is rarely drunk, though it will probably be used in cooking. The degree of softening varies widely according (1) to the hardness of the water in the particular locality, (2) to the efficiency of the softening apparatus, (3) to the time since the softener was last "regenerated," and (4) upon how much water is drunk or used in cooking. It is impossible for this reason to estimate in this manual for general distribution the amount of sodium which may be taken from this source. The low-sodium case is simply warned to remember the possibility that a considerable amount of sodium may be obtained from this source. It is impossible in this place to give directions for estimating the amount. If there is any question about it, the patient will do well to drink water of a more dependable composition. If the water is very hard and has been softened to a very low point, the amount of sodium added to the diet might well be as much as 500 to 800 milligrams of sodium per day. Such an amount would make a really strict low-sodium diet a practical impossibility.

The accompanying map shows what parts of the United States are most likely to have hard public water supplies. It must be

ALTERNATE FOOD CHART FOR ONE DAY
LOW-SODIUM DIET (Approximately 1000 mg.)

Foods to include daily.

All food is prepared without salt, soda, and baking powder. Only the amounts of foods listed should be used. Salt substitutes may be used.

1. Bread, yeast bread prepared without salt—6 slices—*or*
   Matzoth (Passover or Thin Tea)
2. Cereals, unsalted cooked—¾ cup—*or*
   ½ Shredded Wheat Biscuit *or*
   Puffed Wheat and Puffed Rice—1 cup
3. Cream—¾ cup
4. Egg—one
5. Milk, whole—3 cups
6. Unsalted lean meat and fish. Two 3-oz. servings (each piece 3½" × 3½" × ½") Do not use any canned, salted, or smoked meat and fish. Avoid: bacon, ham, sausage, corned beef, chipped beef, herring, sardines, salmon, and tuna. Fish should be fresh and unsalted; such as: bass, halibut, cod, and trout.
7. Unsalted Vegetables.—Five servings daily of ½ cup per serving. Any prepared without added salt. Avoid using the following ones every day because of their high sodium content:—turnips, carrots, beets, spinach, chard, and celery. Avoid using dried peas and beans entirely.
8. Unsalted Potatoes.
   Or substitute 1 cup cooked unsalted macaroni, spaghetti, noodles, *or* ½ cup sweet potatoes, unsalted or 2 slices unsalted bread or Ck. unsalted rice as desired.
9. Fruits.—3 servings daily of ½ cup per serving. Use any unsalted fruits. Avoid dried fruits, except for prunes.
10. Unsalted fat. Unsalted butter or margarine.
    Crisco and Spry and lard. At least 3 tablespoons.
11. Granulated white sugar or jellies (no preservative added) 6 tablespoons.
12. Seasonings as desired. Avoid celery salt and onion salt.
13. Beverages such as black coffee, tea, lemonade, and Koolade may be used unless otherwise stated by the physician.

Foods to Avoid

Bouillon cubes, catsup, meats sauces, canned salted vegetables, olives, pickles, salted butter and other salted fats, salted nuts, sauerkraut, salted baker breads, salad dressing, salted cheese, canned soups.

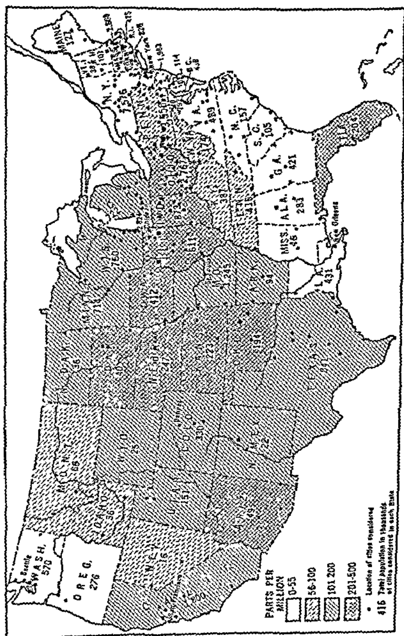
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Water Supplies in Relation to Sodium Content

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In most houses which are supplied with softened water, the processed water is found only in those pipes going to faucets where it will be used for some washing purpose. It is rarely drunk, though it will probably be used in cooking. The degree of softening varies widely according (1) to the hardness of the water in the particular locality, (2) to the efficiency of the softening apparatus, (3) to the time since the softener was last "regenerated," and (4) upon how much water is drunk or used in cooking. It is impossible for this reason to estimate in this manual for general distribution the amount of sodium which may be taken from this source. The low-sodium case is simply warned to remember the possibility that a considerable amount of sodium may be obtained from this source. It is impossible in this place to give directions for estimating the amount. If there is any question about it, the patient will do well to drink water of a more dependable composition. If the water is very hard and has been softened to a very low point, the amount of sodium added to the diet might well be as much as 500 to 800 milligrams of sodium per day. Such an amount would make a really strict low-sodium diet a practical impossibility.

The accompanying map shows what parts of the United States are most likely to have hard public water supplies. It must be


PARTS PER MILLION
0-55
56-100
101-200
201-500
Location of cities considered
416 Total population in thousands of cities considered in each State

remembered that individual wells or public supplies might vary very widely from the map. Cistern water usually is very low in sodium. Water from rivers, lakes, reservoirs and deep wells vary greatly depending upon the source. The housewife need hardly have the water analyzed to know that it is hard, however, for she can tell by the manner in which it reacts with soap. Rarely need this factor be considered in the low-sodium diet except when *a very hard water used for drinking or cooking has been softened by a process using salt in the regeneration of the softener.*

PUBLIC WATER SUPPLIES

Public water supplies always contain some sodium. In many communities the amount is significant. We are indebted to the Research Laboratory of Mead Johnson & Company of Evansville, Indiana, (Journal of American Dietetic Association *25*, 304, 1949), for the following table and discussion.

"PUBLIC WATER SUPPLIES"

"Assuming an average daily consumption of 2 liters of water in food and drink, it follows that if the water contains as much as 25 mg. of sodium per 100 cc., the patient will receive 500 mg. of sodium from water alone, and a diet limited to this amount becomes impossible. It would be a safe rule to use only distilled or deionized water for sodium-restricted patients wherever the municipal supply contains more than 3 mg. of sodium per 100 cc.

"Fortunately, the municipal water supplies of many cities are so low in sodium that they are entirely suitable for use in low sodium diets. There are, however, some outstanding exceptions. Hardness or softness has no bearing on the sodium content of water, except that when hard water is softened by base-exchange apparatus the calcium and magnesium are replaced by sodium in the ratio of 2 atoms of sodium for each atom of calcium or magnesium. Therefore, water which has been softened is always suspect as regards its suitability for low sodium diets and for the preparation of reliquified Lonalac.

"The following table gives the sodium (and potassium) content of the waters of representative cities. Included are the principal cities of the United States, the capitals of the states and many places important as medical centers. The samples were mostly taken in the winter and spring of 1947, and the analyses were made with the flame photometer. Seasonal variations are known to occur, especially in river waters, but river waters rarely contain much sodium.

"Additional data on public water supplies can be obtained from the various state and municipal laboratories, and from a United States Government bulletin compiled some years ago, 'The Industrial Utility of the Public Water Supplies in the United States, 1932' (Geological Survey, United States Department of the Interior, Water Supply Paper 658, Washington, D. C., Government Printing Office, 1934; order from Superintendent of Documents, 25 cents)."

Place	Na in mgm. per 100 cc.
Aberdeen, S. D.	20
Albany, N. Y.	0.2
Albuquerque, N. M.	5
Annapolis, Md.	0.2
Ann Arbor, Mich.	2
Atlanta, Ga.	0.2
Augusta, Maine	0.2
Austin, Texas	3
Baltimore, Md.	0.3
Bangor, Maine	0.2
Baton Rouge, La.	9
Beloit, Wis.	0.5
Biloxi, Miss.	*23*
Birmingham, Ala.	2
Bismarck, N. D.	6
Boise, Idaho	2
Boston, Mass.	*0.3*
Brownsville, Texas	6
Buffalo, N. Y.	0.7
Burlington, Vt.	0.2
Carson City, Nev.	0.4
Charleston, S. C.	1
Charleston, W. Va.	0.3
Charlotte, N. C.	0.3
Charlottesville, Va.	0.2
Cheyenne, Wyo.	0.3
Chicago, Ill.	0.3
Cincinnati, Ohio	0.7
Cleveland, Ohio	*1*
Columbia, S. C.	0.4
Columbus, Ohio	5
Concord, N. H.	0.2
Crandall, Texas	170*
Dallas, Texas	3
Denver, Colo.	3
Des Moines, Iowa	1
Detroit, Mich.	0.3
Dover, Del.	2
Durham, N. C.	0.4
El Paso, Texas	7
Ephrata, Pa.	*0.3*
Evansville, Indiana	2
Fargo, N. D.	5
Frankfort, Ky.	*0.3*
Galesburg, Ill.	30
Galveston, Texas	34
Harrisburg, Pa.	0.2
Hartford, Conn.	0.2
Helena, Mont.	0.3
Houston, Texas	16
Huntington, W. Va.	3
Indianapolis, Indiana	1
Iowa City, Iowa	*0.5*
Jackson, Miss.	0.4
Jefferson City, Mo.	3
Jersey City, N. J.	0.3
Kansas City, Kan.	4
Kansas City, Mo.	10

Place	Na in mgm. per 100 cc.
Lansing, Mich.	1
Lincoln, Neb.	3
Little Rock, Ark.	0.1
Los Angeles, Calif.	
(Aqueduct Source)	*6*
(Metropolitan)	17
(River Source)	5
Louisville, Ky.	2
Madison, Wis.	0.4
Manchester, N. H.	0.2
Marion, Ohio	17
Memphis, Tenn.	2
Miami, Fla.	*2*
Milwaukee, Wis.	0.3
Minneapolis, Minn.	0.5
Minot, N. D.	25
Montgomery, Ala.	0.8
Montpelier, Vt.	0.1
Nashville, Tenn.	0.3
Nevado, Mo.	33
Newark, N. J.	0.2
New Haven, Conn.	0.3
New Orleans, La.	1
New York, N. Y.	0.3
Oakland, Calif.	0.3
Oklahoma City, Okla.	10
Olympia, Wash.	0.5
Omaha, Nebr.	*8*
Philadelphia, Pa	*2*
Phoenix, Ariz.	11
Pierre, S. D.	9
Pittsburgh, Pa.	6
Portland, Maine	0.1
Portland, Ore.	0.1
Providence, Ore.	0.2
Raleigh, N. C.	0.4
Reno, Nevada	0.5
Richmond, Va.	0.7
Rochester, Minn.	0.7
Rochester, N. Y.	0.3
Sacramento, Calif.	*0.3*
Santa Fe, N. M.	0.4
St. Louis, Mo.	5
St. Paul, Minn.	*0.5*
Salem, Ore.	0.2
Salt Lake City, Utah	0.8
San Diego, Calif	5
San Francisco, Calif.	1
Seattle, Wash.	0.2
Sioux Falls, S. D	1
Springfield, Ill.	0.8
Syracuse, N. Y.	0.2
Tallahasse, Fla.	0.3
Topeka, Kansas	1
Trenton, N. J.	0.1
Tucson, Ariz.	3
Washington, D. C.	0.3
Wilmington, Del.	0.8

*An extreme example. *This water is rarely drunk,* but is used for cooking.

Appendix A

Weight Record

By all odds the best way for the patient to check himself *day by day* for progress and for mistakes is to keep an accurate daily *weight* record. He should weigh himself each morning before breakfast, before taking a drink, and after emptying the bladder. Obviously he should be dressed in the same way—pajamas and house slippers suggested—each time. If an increase in weight is noted prompt thought should be given to what may have been unusual in the diet or the activity of the day before. After a few months the patient should by this means have gained a great deal of valuable experience as to what he can or cannot safely do, and with the help of his physician should be able to determine at what weight level he may be regarded as being in a satisfactory weight (water-salt) balance. Once he has determined such a level any deviation of as much as 5 pounds should call for a check by the physician. Gradual increase in weight usually means a gain of flesh; a quick rise is usually due to gain of water.

Not only does such a procedure serve well the needs of the case, but it is an interesting thing to do and tends strongly to develop a sense of personal responsibility in the most important of all clinical cases—one's own case. It will rarely be necessary to record intake of water and output of urine, but in case any difficulty is experienced in holding down weight it may help the patient to understand his problem better if he will do so.

The space below will serve as a start for such a record. If, after a time, he needs additional space he can make his own chart along the same lines and continue it as long as may be necessary.

Date		*Weight*	*What did I EAT, or DO yesterday that was unusual?*
January	1		
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Date		*Weight*	*What did I EAT, or DO yesterday that was unusual?*
February	1		
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Date		*Weight*	*What did I EAT, or DO yesterday that was unusual?*
March	1		
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Date		*Weight*	*What did I EAT, or DO yesterday that was unusual?*
April	1		
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Date		*Weight*	*What did I EAT, or DO yesterday that was unusual?*
May	1		
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Date		*Weight*	*What did I EAT, or DO yesterday that was unusual?*
June	1		
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Date		*Weight*	*What did I EAT, or DO yesterday that was unusual?*
July	1		
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Date		*Weight*	*What did I EAT, or DO yesterday that was unusual?*
August	1		
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Date		*Weight*	*What did I EAT, or DO yesterday that was unusual?*
July	1		
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Date		*Weight*	*What did I EAT, or DO yesterday that was unusual?*
October	1		
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Date	*Weight*	*What did I EAT, or DO yesterday that was unusual?*
September 1		
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Date		*Weight*	*What did I EAT, or DO yesterday that was unusual?*
December	1		
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Date	Weight	What did I EAT, or DO yesterday that was unusual?
November 1		
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Brands of Salt Substitutes

Co-Salt—Casimir Funk Laboratories, Inc., New York, N. Y.
Ingredients: Chlorine, Potassium chloride, Ammonium chloride and Tricalcium phosphate.

Diasal—E. Fougera Co., Inc., New York (13) N. Y.
Ingredients: Potassium chloride, glutamic acid and inert excipients.

"K" salt—Chicago Dietetic Supply House, Chicago, Illinois
Ingredients: Potassium chloride, Ammonium chloride.

Neocurtasal—Winthrop-Stearns, Inc., New York 13, N. Y.
Ingredients: Potassium chloride, Ammonium chloride, Potassium formate, Calcium formate, Magnesium citrate, starch.

Nosalt—Charles Killgore Company, Inc., Yonkers, N. Y.
Ingredients: Potassium chloride, Ammonium chloride, Potassium formate, Magnesium citrate, Dicalcium phosphate, starch.

Saltee Flavor—Makers, Kal, Inc., Los Angeles, California.
Ingredients: Potassium chloride, Ammonium chloride, Tricalcium phosphate, Magnesium citrate, Calcium formate.

Stedasalt—Loeb Dietetic Food Company, Inc., New York, N. Y.
Ingredients: Potassium citrate, Potassium phosphate, Ammonium chloride, Potassium chloride, Ammonium tartrate, Calcium formate, Citric acid and starch.

Subsalt—Universal Products Company, 229 Ashland Ave., Chicago 7, Illinois.
Ingredients: Ammonium chloride, Tricalcium phosphate, Citric acid and starch.

Gustamate—Arlington Chemical Company

This is a product which contains no mineral salts at all. It seems a theoretical possibility that it may be inadequate from the standpoint of chlorides. The chloride deficiency may be overcome by using the earlier mentioned substitutes on highly seasoned or well flavored foods and the Gustamate on the bland ones. In case there should exist any impairment of kidney function with scanty secretion of urine, this would be the best to use as it is the only one which does not contain potassium or other mineral salt.
Ingredients: Monoammonium glutamate, glutamic acid and glycine.

There is probably no choice between the above substitutes except as one may seem of better flavor than another to a particular person. If expense must be considered the patient can buy either powdered potassium chloride or ammonium chloride at the drug store and mix thoroughly with corn starch and a little corn meal. To prevent them from caking with accumulated moisture, the stock supply of this mixture should be in a tightly sealed can or bottle.

Those salt substitutes which contain ammonium chloride may tend somewhat to break down under prolonged cooking at high temperatures.

Appendix B

Companies Producing Acceptable "Sodium-Low" Foods

We have no wish to seem to favor any commercial firm producing food by naming the products sold, but the patient needs to have such information, and the companies which go to the trouble of supplying food for this important minority group deserve to be patronized. The names are given of as many of these companies as could be found without exhaustive research and the suggestion is made that the patient write for lists of foods and prices, and make inquiry as to what local merchants stock such products. Some of the companies will doubtless be glad to do a mail order business. In the interest of impartiality the names of the companies are arranged in alphabetic order. Those companies which offer a wide variety of products are starred (*), while those specializing have the specialty indicated.

Anthony Alphonse DeBole, 120 Sullivan Street, New York 12, N. Y. (Artichoke Breads)
* Battle Creek Food Company, Battle Creek, Michigan (Sanitarium Brand)
Benard Food Industries, Inc., 559 West Fulton Street, Chicago, Illinois (Soups)
* Chicago Dietetics Supply House, Chicago 12, Illinois (Cellu Brand)
* Dietetic Food Company, Inc., Brooklyn, New York
* Happy Hour Foods, Bloomington, Illinois
Holland Honey Cake Company, Holland, Michigan (Salt-free Fruit Cake)
Indian Trail Candies, Grand Rapids, Michigan (Candies and Sweets)
Jasper Wyman & Son, Millbridge, Maine
* Loeb Dietetic Foods, New York 33, New York
Merritts Beaten Biscuit Co., Montgomery, Alabama (Crackers and biscuits)
Pfaffman Company, Cleveland, Ohio (Macaroni, Noodles, *etc.*)
* Reid, Murdock Company, Chicago, Illinois (Monarch-Dietetic Brand)
* Sprague, Warner Company, Chicago, Illinois (Dietaro Brand)
Van Brode Milling Company, Inc., Clinton, Mass. (Breakfast cereals)
Van Camp Laboratories, Terminal Island, San Pedro, California (Tuna Fish)

Write for retail order blank with listing of products and prices.

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Co-Salt—Casimir Funk Laboratories, Inc., New York, N. Y.
Ingredients: Chlorine, Potassium chloride, Ammonium chloride and Tricalcium phosphate.

Diasal—E. Fougera Co., Inc., New York (13) N. Y.
Ingredients: Potassium chloride, glutamic acid and inert excipients.

"K" salt—Chicago Dietetic Supply House, Chicago, Illinois
Ingredients: Potassium chloride, Ammonium chloride.

Neocurtasal—Winthrop-Stearns, Inc., New York 13, N. Y.
Ingredients: Potassium chloride, Ammonium chloride, Potassium formate, Calcium formate, Magnesium citrate, starch.

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Ingredients: Potassium chloride, Ammonium chloride, Potassium formate, Magnesium citrate, Dicalcium phosphate, starch.

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Ingredients: Potassium chloride, Ammonium chloride, Tricalcium phosphate, Magnesium citrate, Calcium formate.

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Pfaffman Company, Cleveland, Ohio (Macaroni, Noodles, etc.)
* Reid, Murdock Company, Chicago, Illinois (Monarch-Dietetic Brand)
* Sprague, Warner Company, Chicago, Illinois (Dietaro Brand)
Van Brode Milling Company, Inc., Clinton, Mass. (Breakfast cereals)
Van Camp Laboratories, Terminal Island, San Pedro, California (Tuna Fish)

Write for retail order blank with listing of products and prices.

Appendix C

The following blank pages may well be used to record new recipes and devices for making the diet more attractive or more diversified. We suggest that patients on the "low-sodium" diet compare notes and exchange kitchen hints among themselves.

The objectionable taste of the salt substitutes—if any—are more pronounced when they are on the surface of the food. Taste will be improved if the salt is allowed a bit of time to penetrate before the food is eaten. Practice will enhance the results obtained. The patient should experiment in the use of these products.

There is a product known as "Eka Salt" produced by Sharpe and Dohme which is sometimes used as a salt substitute but which contains about half as much sodium as common salt. Its ingredients are sodium malate, sodium citrate, and ammonium citrate with 0.5 per cent manganese bromide. It will be noted that it has no chloride. We cannot, in this present relation, recommend it as a salt substitute. A physician might wish to recommend it for persons who have particular needs.

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